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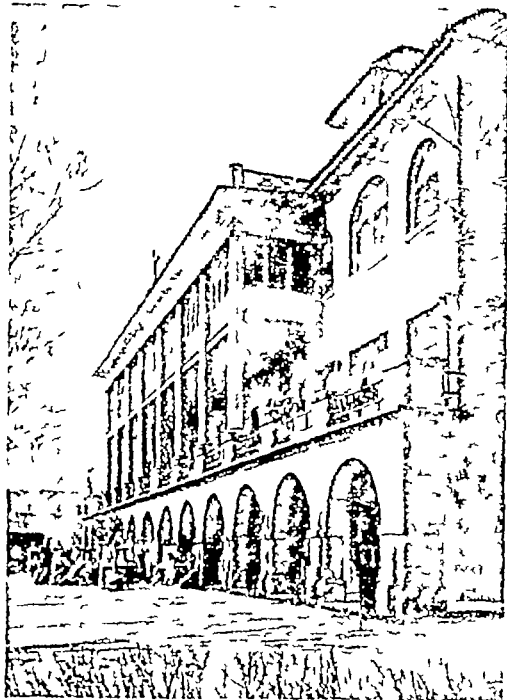
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GEORGE FOSTER HERBEN, M.D.

Physician in Chief



St. Joseph's Sanatorium

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O E EGBERT, M D
Physician in Chief

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OF THE

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C M HENDRICKS EDITOR IN CHIEF

(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"

Lawrason Brown, M D

Editorial Comment

Solving the Tuberculosis Problem ONE OF the most important things in the solution of the tuberculosis problem will be solved when the

Medical Profession realizes that the disease may be diagnosed early and the people learn that it is to their advantage to see that every case of tuberculosis may be cured and cured as promptly as possible. The development of tuberculosis as a speciality in medicine has led many to suppose that only the highly specialized physician can diagnose the disease early. By early, we do not mean the early days of active manifestation, but the time when the symptoms are indefinite and may be the result of a variety of causes. This is a mistake. With no desire to minimize the difficulties met with in diagnosing tuberculosis in any of the stages prior to its most frank manifestations, we insist upon it that the procedure is comparatively simple in the vast majority of cases. It is true that much must be taken for granted, but it is better to play safe and keep the disease constantly in mind.

Pulmonary tuberculosis is still by far the most frequent chronic pulmonary disease and by keeping the disease constantly in mind when symptoms may not be accounted for readily and specifically, the routine tuberculosis regime should be instituted and maintained for a sufficient time to arrive at an accurate diagnosis. If the attending physician is not given the opportunity to make the necessary investigations, the patient should then be referred to the specialist. C M H

Segregate the Open Case THERE IS a very generally accepted axiom among students of childhood tuberculosis to the effect that, if a child is exposed to an individual having an open lesion of tuberculosis a sufficiently long period of time, he will become infected with tubercle bacilli.

In studying the relationship of exposure to infection in two thousand children examined at the Lymanhurst school (Minneapolis), Magiera divided the cases into the following groups: (a) definite history of exposure, (b) questionable or unsatisfactory history of exposure, and (c) no history of exposure. Among these 761 gave histories of intimate contact with definitely tuberculous patients. Of this number 435 presented positive reactions to the Piquet test.

These facts serve to impress the importance of segregating patients with open lesions as a preventive measure.

When a sufficient number of beds in sanatoria are provided to accommodate all patients having open lesions, and these patients are required by public health regulations to enter some good sanatorium, the greatest possible step will have been taken toward eradication of tuberculosis in that the most formidable source of infection will have been controlled. R B H

The Depression and Tuberculosis THE DEPRESSION has brought to the physician perplexing tuberculosis problems, both professional and economic.

Poor nourishment, close housing, exposure from lack of heat and clothing and mental worry have been conducive to initial breakdowns and reactivations of tuberculosis. Lack of funds for hospitalization is responsible for increased number of contacts with open tuberculosis and, worse still, prolongs the contact.

We are, therefore, on a sharp rise in the incidence of tuberculosis which has already gathered enough momentum to carry the incidence upward for at least another two years regardless of whether or not conditions soon improve.

We are, naturally, hopeful that economic conditions will improve to where these cases may avail themselves of hospitalization and intensive treatment early. However, to expect this is too optimistic. Some sort of cooperative plan must be worked out between the physician in the field and the sanatorium hospitalizing tuberculosis. The institution must lower its rates being satisfied with maintenance levels only, trying to make possible at least a short period of hospitalization for the patient. Treatment and institutional training must be prosecuted intensively in an effort to shorten the period of hospitalization and return the patient to his physician at the earliest possible date for completion.

There will still remain an appalling residue of indigent cases of tuberculosis. The burden of hospitalizing them must fall on the Relief Administration, the State, County and Municipality.

The policies of many of these institutions are obsolete and many of these obsolete policies are defined by law. Twenty-five years ago only early tuberculosis could be treated successfully. As a consequence the public-owned institution of that generation would receive only early tuberculosis. Only too many public-owned institutions still retain that policy.

"The greatest good to the greatest number" must always be the governing policy of the state-owned institution. Open tuberculosis ONLY should be treated at public expense. Intensive modern hospitalization is most effective on the exudative, positive sputum cases. Modern treatment can close open tuberculosis. That

is the greatest good to be done the patient. But the greatest good to the greatest number is, first in isolating this open case from possible contacts, closing his case and returning him to his normal contacts no longer a menace to society. O E E.

Death-Rate Cycle WE HEAR a great deal about the reduction in the death-rate in tuberculosis, and naturally lay a great deal of claim to our efforts during the past twenty years in education, prevention, and treatment. It is surprising, however, that the death rates from tuberculosis in states which have done little or nothing toward the control of this disease have decreased as much, and in some states more, than in those states where a great deal is being done.

There is a theory and explanation of this fact that tuberculosis may occur in epidemics and that it takes about two hundred years for an epidemic to reach its high point and subside and that we are in the midst of the subsidence now.

C M H

Fascism and Tuberculosis FASCISM HAS engaged in a regular campaign to drive tuberculosis out of Italy.

Its chief weapon will be an obligatory insurance system now enforced for employees, workmen, and servants of all categories. Over twenty million persons are insured against tuberculosis and the Italian Government has recently announced that they will have twenty thousand beds in sixty sanatoria available in the next two years. Fascist organization boasts that nothing so ambitious has been attempted in any other country. However, in 1904 there were forty sanatoria in the United States with approximately two thousand beds, while today there are more than sixty thousand beds available in almost seven hundred sanatoria. C M H

Results of Pasteurization Statistics now show that less than ten per-cent of deaths from tuberculosis in children are due to the bovine type, deaths from the same cause in adults are negligible.

Four Fundamental Principles in the Treatment of Tuberculosis Established by Brehmer

WHEN BREHMER established the first permanent sanatorium for the treatment of tuberculosis at Goerbersdorf,

BY
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in 1859, he did much more than establish an institution—he laid the foundation for the successful treatment of a disease which during all previous ages had been considered hopeless. Although some of the principles which he thought were important have not endured, the fundamental fact that tuberculosis can be treated successfully under controlled conditions with a well-directed plan was for all time established.

It is well for physicians who are interested in the treatment of tuberculosis, more especially those who are connected with sanatoria, to satisfy themselves as to why the institutionalizing of tuberculous patients made their cure possible, for upon the proper understanding of the principles involved rests the superstructure of sanatorium treatment.

I would designate the following as the outstanding principles of therapy established by Brehmer:

- 1 The isolation of the patient
- 2 The control of the patient under continuous medical supervision
- 3 The substitution of hygienic for unhygienic living conditions
- 4 The substitution of a definite therapeutic technic for the hitherto haphazard methods

1

The removing of the patient from his accustomed environment—domestic, social and business—and protecting him from the cares incident thereto, is one of the fundamental advantages of the sanatorium. In discussions on benefits of sanatorium treatment it is rarely emphasized as it should be, but rather taken for granted. It should receive special emphasis, however, because upon it the cure of the patient often depends. The confusion and cares which accompany the normal

activities of life call upon the patient suffering from tuberculosis for far more strength and energy than he can safely

expend while fighting his infection. It is difficult for him to live with the well without being one of them. In many instances the extent to which the patient is shielded from the usual cares of life determines the result obtained. The patient is best protected from such injurious influences by being removed from the environment in which they are found.

2

Another great contribution of the sanatorium is the control of the patient. No one conversant with the treatment of tuberculosis can fail to appreciate what this means. Tuberculosis being a chronic illness which goes through alternate phases of activity and quiescence, in which the patient's life is now in great danger and again in less, calls for continuous control of the individual's activities and requires changes in program to meet the condition present at the time.

By close association of patient and physician, such as occurs in a sanatorium, the physician learns to know not only the nature of the patient's disease but also his peculiarities of personality, and the individual factors in his constitution which make for success or failure in treatment, and therefore knows how rigid the control must be to attain the result desired.

One can not overestimate the value that comes to a patient from the close supervision of a knowing, sympathetic physician, who is ever at hand with his advice and counsel. It shifts the burden from the patient and his friends who are rarely sufficiently trained to assume the responsibility to one who is trained for the task assumed.

3

When Brehmer established his institution there were few hygienic homes, in fact, modern hygiene and sanitation had

not yet been developed. People were still living in homes ill-suited to human habitation, as we understand its demands today.

The taking of patients from the usual environment afforded by life in a large city and transporting them to a healthful country district and housing them in large, airy, well-ventilated buildings which offered greatly improved living conditions, and instructing them to live on the highest hygienic plane then known, established a standard which has ever since been accepted as fundamental to any regimen designed for treating tuberculosis.

4

Every one recognizes the importance of technic in surgery, but we hear insufficient talk of it in connection with the medical aspects of disease, yet a technic lies at the basis of success in treatment of all diseases. It is especially apparent in such types of illness as tuberculosis, diabetes, diseases of the heart and kidney. Outstanding men in medicine may differ in the measures which they employ, but

every one either adopts or devises a technic to which much of his success is due.

Brehmer, in devising a program for his sanatorium, eliminated haphazard methods and established a definite regimen in their stead. While the program has been modified from time to time, as greater knowledge and experience have been gained, progress has always been in the way of making the regimen more definite and the technic more exact.

While the transmissibility of tuberculosis, the discovery of the bacillus, the tuberculin test, the X-ray, many improvements in methods of diagnosis, and the elaboration of therapeutic measures such as the proper application of rest and exercise, dietetic programs, a better appreciation of the open-air life, the therapeutic use of tuberculin, various applications of chemotherapy, and methods of relaxing and compressing the diseased tissue have all been elaborated since Brehmer established the first sanatorium, yet the four cardinal principles first applied by him are still a fundamental part of every therapeutic regimen.

History of the Sanatorium Movement in America

IT HAS probably been the dream of most physicians, who have had to be under treatment for tuberculosis, to

control a place where ideas, formulated during hours of contemplation, could be carried out. It was undoubtedly for some such reason that Brehmer first started his sanatorium in Silesia and became the originator of the modern sanatorium treatment of tuberculosis, though others had made the attempt before. He wished an institution where he could not only treat his patients with rest, but also by certain exercises, as he had the idea all tuberculous patients had small undeveloped hearts.

Dettweiler, a patient of Brehmer, differed with him about exercise for the heart, and built a sanatorium at Falkenstein where he could put into practice his

BY
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idea of absolute rest. Dr. Walter, another patient, built his sanatorium in the Black Forest and it became well known

in England with its treatment by rest, excessive nourishment, etc.

The sanatorium idea was well established in Germany when Trudeau first read of it in 1882. Trudeau had had the experience of caring for his brother until he died of an acute case of tuberculosis. For several months he was confined in a room with his brother, the windows of which were never opened, by the orders of his physician. It made a deep impression on him when he also had contracted tuberculosis and had spent some time in the Adirondacks in the open air with much benefit. He had gone to the mountains, not because of the therapeutic effect, but

because he enjoyed the kind of life he could live there. Realizing the improvement, he was in a receptive mood to be influenced by the sanatorium idea.

Dr. Alfred Loomis, noticing a marked improvement in Trudeau's condition after a winter in the Adirondacks, started sending patients to Saranac Lake to try the effect of the winter climate. The lack of places to house these patients, especially those of very moderate means, decided Trudeau to build a few cottages. In his biography he says, "I was also much impressed at that time with the difficulty of obtaining suitable accommodations in the Adirondacks for patients of moderate means. The rich and well-to-do could hire one of the few guides cottages in Saranac Lake or pay them well for taking them to board, but there was absolutely no place for working men and women who came here with short purses. It therefore occurred to me that a good piece of work could be done in helping these invalids, for whom my sympathy, ever since my brother's death, had always been keen, by building a few small cottages where they could be taken at a little less than cost and where the sanatorium method could be tried."

Dr. Trudeau was able to establish his Adirondack Cottage Sanatorium in 1884 through donations from friends. So the beginnings of the sanatorium movement in the United States started because of the need of a place where patients could get room and board, rather than a place where treatment could be given.

This was also true in the Rocky Mountain region which had been known as a

resort for the tuberculous since the days of the trappers a hundred years ago. Wagon trains going west for trading or taking settlers looking for lands or gold, would frequently take along one or more "consumptives" too ill to sit up, and, if we believe all the stories that were told, they always recovered. It was not strange therefore that many patients flocked to the west as soon as railroads were built, and the problem of taking care of them arose. The Catholic hospitals established in various places in the west took care of some of these and other church organizations built homes for this purpose.

It was not long, however, before the sanatorium idea as developed at the Adirondack Cottage Sanatorium by Dr. Trudeau and his associates began to influence the treatment of tuberculosis. The sanatorium became a place for treatment as its main objective rather than a place for segregation or just housing the tuberculous. Then the need became apparent for sanatoria in favored locations where patients could receive very specialized and individual care, and the private sanatorium came into being. These not only gave more efficient care and added refinements and comforts than were possible in large public institutions, but were individual in that each usually reflected the ideas of one man, the medical head. The private sanatorium has been one of the most important factors in the campaign against tuberculosis, in not only developing the treatment, but in giving patients surroundings where they could pursue a long period of treatment in a congenial atmosphere.

"TUBERCULOSIS," by Dr. Fred G. Holmes (D. Appleton Century Co.)

The book "Tuberculosis" written by Dr. Fred G. Holmes is a most cleverly conceived and written manual for the patient, or for anyone that may be concerned about tuberculosis.

Dr. Holmes very courteously receives the patient in his office, examines him physically, then carries him thru the clin-

ical laboratory and x-ray. He then sits down with his patient in his consultation-room and advises him as to his treatment, whether at home or in a sanatorium. Later, the doctor visits the bedside of his patient, and carries him thru the various phases of rest, hygiene, diet, and finally thru the "reconstruction period" back to normal.

The book will be invaluable both to the physician and his patient. C M H

The Clinical Aspect of Early Tuberculosis

CLINICAL TUBERCULOSIS is usually described and thought of a disease running a quiet, sedentary, extremely chronic

course. The onset of this disease is usually thought of as being characteristic of the low-grade type of infection, with such symptoms as loss of weight, malaise and a slight elevation of temperature. For twenty-five years teachers have urged with great zeal, the necessity of clinicians recognizing these low grade symptoms of tuberculosis, together with the mild changes that occur in the physical findings, and have held that recognition of this syndrome constituted an early diagnosis of pulmonary tuberculosis. As a result of this teaching, by and large, the average physician is quite adept at picking up early symptoms and physical findings. Particularly has this been true following the special instruction given a great number of physicians during the War period. In spite of the victory, we are chagrined to find that we are not sufficiently affecting the incidence of this disease. We are still more chagrined to note that when cases in this particular stage are found we are too frequently unable, in spite of proper management, to interrupt the cycle until the disease has progressed to the exudative and ulcerative stages.

This failure to meet the tuberculosis problem has been laid at the feet of general practitioners of medicine. In my opinion, they have now cast the gauntlet back at the feet of the students of tuberculosis, and on the defensive, phthisiologists must offer to the profession some different solution of the problem.

We do not have to go beyond the realm of our present-day knowledge of the pathology of pulmonary tuberculosis, to construct an obvious clinical picture that antedates the low-grade stage of the disease that we have heretofore called "early tuberculosis."

BY
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In the beginning I would like to qualify clinical tuberculosis as the chronic pulmonary tuberculosis usually seen in adults. Opie states that active pulmonary tuberculosis (phthisis) is always accompanied by evidence of a preceding tuberculosis infection. We rule out, therefore all the primary infections, such as acute miliary infection, and those primary infections that yield the lymph node tuberculosis of childhood.

Wherever tubercle bacilli are deposited in the body of an individual who has not previously been host to this infection, they produce swelling and distortion of the cells in their immediate vicinity. Between these swollen cells will creep the epithelioid cells from capillary walls, working and wedging themselves in towards the focus, resulting in the formation of the giant cell, and surrounding this field of epithelioid infiltration there are usually numerous lymphocytes. It is irrelevant here to carry the tubercle through its complete cycle. If the amount of infection is overwhelming, the invasion will progress, apparently uninterrupted, until the entire organ is involved.

We will pass to consideration of the case in which the tuberculous focus develops secondarily to a primary infection. When tubercle bacilli are introduced into an individual who has already had a primary infection, the reaction is profound. Krause believes that even their mobilization is greatly inhibited, as they migrate to one part of the body or another, whether by blood or lymph stream, or by migrating between the cells. Quite certainly when the bacilli become focalized, there is a profound reaction. There seems to be greater distortion of the cells about the focus, a greater increase in the number of epithelioid cells, of monocytes, and especially of lymphocytes. The inflammatory process becomes so profound that it

frequently results in consolidation. As the tubercles mature the area of inflammation beyond them becomes greatly increased, and in the instance of the lung, this inflammatory process and consolidation is a true localized pneumonitis.

I am not speaking of caseous pneumonia, but rather the pneumonic process that long precedes the caseation stage, and I would further emphasize the occurrence of the consolidation beyond the actual tubercles themselves. Calmette says, "until the last few years it was accepted that in all forms of tuberculosis the presence of tubercles was essential and characteristic." Leon Bernard proved the existence of the inflammatory reactions without tubercles, which are capable of being produced through tubercle bacillus infection. "The composite anatomical picture found in a tuberculous lung," says Renon, "corresponds to the aggregate of the successive pneumonic extensions which make up the clinical history of every pulmonary tuberculosis. To these pneumonic lesions tubercle formation may or may not add itself here and there, but the essential element of the lesion is always the pneumonia." That this conception is obviously the only one which enables us to understand why the tuberculous infection manifests itself at times by small localized foci of inflammation, which tends to fibrous transformation and again by foci of severe infection, resulting promptly in cell necrosis and afterwards in the formation of true tubercle." Morlock in speaking of early phthisis says "that this initial infiltration is represented by a small area of broncho-pneumonia, surrounded by perifocal inflammations. The initial infiltration spread by small aspiration broncho-pneumonic areas that form around the the initial lesion."

This inhibiting inflammatory reaction, creating areas of broncho-pneumonia beyond the tubercle themselves, and occurring in those individuals previously infected with the tubercle bacillus, is regarded by many as allergic in character.

In a personal communication, Allen Krause says, "In fact, as I grow older I find myself saying more and more that,

if the truth were known, it is likely that every case of pulmonary tuberculosis that comes to clinical appreciation does so because of allergic manifestation."

In comparing the tuberculous pathological processes existing in experimental rabbits and human beings, Medlar and Sasano believe that the chief reason for the difference is that the human being has had some previous contact with tubercle bacilli and thereby has developed reaction to infection, whereas the rabbits experience their first contact with the tubercle bacillus on the day they are inoculated. Krause states, "That vigor and great speed marked the reaction of the infected, therefore the allergic and immunized. Moreover the allergic reaction is inflammatory, while that of the non-tuberculous animal to the first infection is primarily proliferative. We believe, therefore, that the specific tuberculo-immunity occurs through a fixation of germs that result from the operation of the allergy reaction. An almost immediate inflammatory outpouring hems in the bacilli more or less effectively, and thus delays or prevents their spread which is so facile and rapid in the non-tuberculous, non-allergic animal."

Allergy in the tuberculous is a big and dangerous subject and there are many unsettled theories regarding it. As to whether or not allergy and immunity are synonymous, as to whether or not tuberculin sensitivity measures immunity or only allergic sensitivity, are unsettled and debatable issues. But since in this particular discussion we are not interesting ourselves in the fate of the individual, but rather in the diagnosis of early clinical tuberculosis, we can avoid the debatable ground limiting the consideration to the marked inflammatory process that exists in and about the tuberculosis focus of the secondarily infected individual.

Against this theory of allergy there are those who believe that this inflammatory process is a secondary non-tuberculous infection. In the very recent publication of Metzler and Sasano, they point out that cavitation in human pulmonary tuberculosis is very commonly ascribed to a se-

condary infection of a tuberculous lesion with pus-producing bacteria, such as the pneumococcus or the streptococcus

"We have used the term tuberculous abscess frequently. These lesions are typical abscesses, composed almost wholly of neutrophils. They are pure tuberculous lesions in animals never before infected with tubercle bacilli. We have seen that these abscesses can rupture just the same as any non-tuberculous abscesses can rupture. This typical pus can be produced as a reaction to pure tubercle bacillus infection. I can see no logical reason for attributing cavity formation, or even abscess formation, to secondarily invading pus-producing bacteria."

From this pathological review, I hope that it will be agreed that secondary infection of tuberculosis, which I have termed clinical tuberculosis, when focalized in the lung produces an immediate and violent reaction, characterized by inflammation and consolidation, a true area of pneumonia, usually spoken of as broncho-pneumonia.

Let us turn now to the clinical manifestations that such pathologic condition would create. A rapidly developing area of inflammation and consolidation in the lung should produce a rise of temperature, possibly ushered in with a chill. There should be a reflex cough present, and in the instance of the lesion lying close to the pleura, it would possibly be accompanied by pleuritic pain. Such a lesion should yield the altered breath sounds and rales incident to the exudate present in the alveoli. Such a clinical picture might be diagnosed as broncho-pneumonia, influenza or pleurisy, and, practically speaking, it is so diagnosed. It is quite obvious that such a diagnosis might be correct, but that it might also constitute only half of a diagnosis, or in the instance of influenza an incorrect diagnosis. Unfortunately, it is the etiological half of the diagnosis that has not been clarified, when such processes are called broncho-pneumonia or pleurisy.

The British author Morlock, in speaking of early phthisis, says, "The clinical aspect is that of a short acute febrile at-

tack with indefinite symptoms. It is frequently diagnosed as influenza." Many of these acute illnesses are diagnosed as pleurisy. Calmette says "that about the isolated areas of pneumonia the lung is more or less congested, infiltrated and emphysematous. These changes find their way to the overlying pleura. The lung tissue underlying the pleural lesion is found congested, infiltrated with fibrin and leukocytes and at times consolidated." When these broncho-pneumonic areas are due to tuberculous infection, their tendency towards subacute or chronic conditions prolongs the inflammatory process existing on the pleura, producing the inevitable exudate we know as an effusion. Most of us today regard a sero-fibrinous effusion as pathognomonic of tuberculosis until proved otherwise.

When we consider that the mother lesion producing the sero-fibrinous pleurisy is broncho-pneumonia, and that it is due to tubercle bacilli, it should be sufficiently impressive for us to conclude that the etiological factor capable of producing any broncho-pneumonia, is the tubercle bacillus.

Following the clinical course of the patient who has had a tuberculous broncho-pneumonia, we find that in due time the inflammatory process subsides and with it the symptoms, including the fever. The patient apparently returns to normal. Landouzy says, "Usually, however, the convalescence is not genuine, the patient does not regain his normal spirit, the keen appetite of the convalescent fails to appear and the loss of weight is not regained. After a few weeks or months there appears abruptly or stealthily the signs of a localization of the tuberculosis, most frequently pulmonary or pleural." The patient will complain of malaise, a brassy, irritating cough, low grade temperature and night sweats. He may even go eventually symptom-free or at least he may be in sufficient state of well-being that he will ignore the indefinite symptoms until within the matter of a few weeks he again has the "flu," and it is possible that within a few weeks following the second attack of "flu," he will give the

symptoms usually described as symptoms of "early tuberculosis"

If every case of broncho-pneumonia were managed as though the etiological factor producing the process were the tubercle bacillus, we would make frequent roentgenograms and find that the area of inflammation does not completely subside, as it apparently does when the etiological factor is the pneumococcus or the Pfeiffer bacillus. There would persist on the plate a small, but at the same time, definite shadow, that from week to week would not clear. If we would follow this to the next acute exacerbation, we would find a larger area of inflammation. With this second acute process subsiding into a chronic one, we would find the persisting shadow possibly larger and denser. After some of these acute processes, we would eventually find a degeneration into the soft exudative lesion that would yield sputum positive to tubercle bacilli examination.

I would emphasize that chronic pulmonary tuberculosis is a disease with an acute onset and prone to acute exacerbations, with periods in between when it runs a quiet, sedentary, low-grade course. The acute onset and the subsequent exacerbations are only too frequently diagnosed as other infections, at least from the etiological viewpoint. Should we describe this disease graphically, it would be a series of sharp peaks with low wide valleys in between. The clinical onset would not be in the low valley of the graph, but would start with a short peak indicative of an acute onset. A truly early diagnosis of clinical tuberculosis is not made when the disease is at the low-grade stage. And, in my opinion, because we have been calling this stage early tuberculosis, we are meeting failure in arresting the onslaught in the many cases not discovered until this particular stage.

I think we should urge the clinicians to go to the bedside in this acute pulmonary case, even with the consciousness that the acute pulmonary lesion may have as its etiological factor the tubercle bacillus. If the patient in such case is not discharged with the subsidence of the acute symp-

toms, but is retained under observation, possibly at rest, for a longer period of time and, most important of all, watched with frequent roentgenograms, even with the feeling that this might be a truly early case of pulmonary tuberculosis, I would prophesy the complete control, before many years, of this most formidable of all infections. I would hold as defense of this prophesy the results had in the management of cases of sero-fibinous pleurisy as though they were of tuberculous origin. Whether or not the fluid was aspirated is beside the point, but if the patient was kept in bed for three months, at rest, until the effusion had disappeared, and until x-ray evidence had cleared, arbitrarily it may be said that case did not progress to one of advanced ulcerative tuberculosis. If such management of cases of tuberculous broncho-pneumonia lying close to the pleura, results in cure, such management of tuberculous pneumonia more remote from the pleura should also result in cure.

The High Cost of Tuberculosis THE NATIONAL Tuberculosis Association has recently made public the following figures

It is estimated that there are about one and one-half million people in the United States today who have tuberculosis. The importance of early diagnosis and treatment from the financial standpoint alone is shown by the following figures:

When diagnosed within six months of the appearance of the first symptom, the cost of illness for each patient is twenty seven hundred and fifty dollars. If the diagnosis is not made between the sixth and twelfth month after the first symptom, the cost rises to thirty one hundred and twenty five dollars. When more than one year elapses between the first symptom and diagnosis the cost rises to thirty nine hundred and fifty dollars. C M H

Tuberculin Test THE TUBERCULIN test has been used in millions of cases throughout the world with no untoward results when the proper dilutions of tuberculin are applied.

Laryngeal Tuberculosis

LARYNGEAL TUBERCULOSIS

is the most serious and in many cases the most distressing complication of pulmonary tuberculosis, with the exception of tuberculosis of the pharynx and mouth, and is generally conceded to be a lesion secondary to the lung invasion. There have been a few cases reported as of primary origin, but the number has been so few and the authenticity surrounded by so much doubt that they may be considered negligible. The frequency of its occurrence is not absolutely established and the estimates of different laryngologists differ quite widely. Thus Heinze of Leipzig found the larynx involved in only 5% while Osler placed the figure at from 18 to 20%.

In an analysis of 3000 cases of patients suffering with pulmonary tuberculosis, I have been led to believe that all cases in which the pulmonary disease has progressed beyond the incipient stage present some degree of abnormality and that about 78% are non-tuberculous, (probably caused by coughing or clearing the throat), while the remaining about 22% are tuberculous. I base this conclusion on the fact that of the 3000 cases, 654 had definite manifestations of the laryngeal lesion.

SYMPTOMS—In patients in whom no ulceration is present there is frequently a hacking cough which is probably caused by irritation in the larynx. When ulceration is present, especially if it is situated in or immediately below the inter-arytenoid sulcus it may be the cause of cough, yet it is more likely that the constant coughing is a result of the disease in the lung.

One of the earliest symptoms which is too often neglected or not considered, is a *tiredness* in the throat caused by too much talking. This may occur many times before the next subjective symptom occurs, which is *alteration of the voice*, and which may manifest itself at first as only a little roughness of the vocal sound, but as the disease progresses, its char-

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acter changes to a hoarseness or even to a very hoarse note. During this period of hoarseness of the

voice there may be attacks of *aphonia* of various duration and which may recur many times. Many patients give no heed to these symptoms until they begin to experience the next symptom, which is *pain* in the larynx and which may radiate to the ear. This symptom may at first be only an uncomfortable feeling, that increases as the disease begins to attack certain areas in the larynx, until it becomes so exceedingly distressing that the patient would rather go without eating or drinking, than suffer the distress caused by the act of swallowing.

OBJECTIVE SYMPTOMS—The first impression that one usually gets when examining the larynx of a patient suffering with pulmonary tuberculosis is that it is moderately or exceedingly red in color or that it is very pale, neither of which conditions is in itself indicative of tuberculosis in the larynx. The varying shades of redness may be produced by many other factors and the paleness is usually of anaemic origin. In regard to these two signs their weight of evidence should depend upon the stage of the disease.

Apart from any change in color the first objective sign is an *infiltration* of the mucous membrane which may be unilateral or bilateral and may begin in any part of the organ, and extend until the whole larynx becomes involved. At this stage of the disease the color is sometimes quite red, yet in some cases it may be pale due to a general anaemia. If infiltration or swelling is allowed to continue it may increase until *edema* occurs which may involve a large part of the larynx and become so extensive that vision below the arytenoids is impossible, and the patient may have great difficulty in breathing, even to a point where tracheotomy may be required. (Hence the importance of early diagnosis and treatment.)

Ulceration does not take place until the tubercle appears at or near the surface of the mucous membrane, where it breaks down, spreads and by coalescence with others goes on until the ulceration may include large areas of the larynx. If a single ulcer has developed and proper treatment is instituted at once the prognosis as to a cure is very much better than when the case is allowed to progress until large areas are involved. In general an ulcer in the larynx appears with irregular, poorly defined edges, and is of a grayish color. On the vocal cord the ulcer begins as a small reddish spot (a developing tubercle) which breaks down and with others may give the appearance of a "mouse-eaten" cord.

DIAGNOSIS —In cases where the laryngeal disease is in its incipency it is not always possible to make an accurate diagnosis at once, but laryngeal tuberculosis being almost invariably, if not always, secondary to the pulmonary disease, when suspected should be treated as such unless the condition in the larynx gives positive evidence of some other disease such as syphilis or a malignant lesion or inflammation due to some other ascertainable cause.

When the disease has advanced to the stage of edema or ulceration the diagnosis usually may be made readily, though the possibility of a mixed lesion should always be borne in mind. In any event the history of the case coupled with the presence of tuberculosis in the lungs will remove the difficulty of making a correct diagnosis in most cases.

TREATMENT —The treatment of laryngeal tuberculosis may be either medical or surgical. In the incipient cases local applications will be all that is required in a large number. In all cases whether incipient or advanced *rest* of the muscles of the larynx should be insisted upon. Modification of this statement may be left to the judgment of the laryngologist who may feel justified in allowing his patient to use a lip whisper, yet in most cases the prospect of cure will be better by putting the vocal cord at absolute rest and having the patient use a pencil and paper pad for making his desires known.

The local treatment may be carried on by the use of a cotton-tipped applicator or by instillation or by spray, and the remedy used should in most instances be in an oily vehicle in order to prevent production of cough. There have been many remedies used and for most of them their day has ended. There are two preparations, however, that stand out from all the others, as being of very great value. The *Burmese Chaulmoogra Oil* is one of them. This oil may be used in any strength desired, either by swab or instillation, its use however should at first be preceded by an application of cocaine (10%) and care should be used to be sure that the oil reaches the larynx and does not go into the stomach. It is a good preparation to use in any stage of the disease.

The second preparation of great value is *Formalin* of very mild strength. Many pharmacists confuse Formalin with Formaldehyde, which of course is inexcusable. A 10% solution of Formalin reduced to the required strength by a proper vehicle, even down to a one-half of one percent, may be put in the hands of the patient to use as a spray between professional treatments, with very pleasing results.

HELIO THERAPY —In reflected light, either of the rays of the sun or the Ultra-Violet rays from the lamp, we have an aide of value in many cases, especially in the incipient and moderate stage, and some good reports have been given by those who make use of this agent.

However, none of the measures mentioned are wholly satisfactory, and if a patient suffering with laryngeal tuberculosis is under treatment with any one of the remedies mentioned and does not show definite improvement in a reasonably short time, his life should not be held in jeopardy, but recourse to *surgical treatment* should at once be made.

In the galvanocautery we have at our hand an agent that to all intents takes the place of all other surgical measures that have heretofore been introduced for the curative treatment of this disease, except in very exceptional and uncommon conditions. When properly used it gives great relief from pain in most cases. It is the surest means that we possess for overcoming the ulceration and presents the greatest hope for a cure that we have.

The Surgical Treatment of Pulmonary Tuberculosis

THE EVOLUTION of surgical methods to furnish added rest to the lung still remains

the foremost advancement in the treatment of pulmonary tuberculosis. Through this intermedium, it is possible to retrieve many cases believed incurable because of extensive invasion of the disease.

Obviously, routine sanatorium care alone is an insufficient combative measure for patients who have progressed to the stage of cavity formation, where the possibility of infection to the opposite lung, throat, or intestines may render the case beyond all hope of repair. The methods of recognized merit for providing additional rest to the lung, aside from bed and postural rest, are included under "collapse therapy"—those of paramount importance being artificial pneumothorax, intrapleural pneumolysis, phrenic neurectomy and thoracoplasty.

ARTIFICIAL PNEUMOTHORAX

Artificial pneumothorax is the most universal method of compressing the lung, but owing to pleuritic adhesions, it is availing in less than one-half the cases where indicated. We have treated over 1700 patients by this method during the past 25 years, these were comprised mostly of stage III cases, of whom nearly 50 per cent were rehabilitated. With the regular sanatorium routine of care alone, probably not over 5 per cent would have recovered.

INTRAPLEURAL PNEUMOLYSIS

If pleuritic adhesions are hindering the lung collapse, the closed method (intrapleural pneumolysis) of severing them should be considered, after a three to five months trial of artificial pneumothorax. I do not recommend the stretching of adhesions, as tears may result in spontaneous pneumothorax and empyema. Empyema is also a very common complication of

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extrapleural pneumolysis (open method), which I do not uphold.

Intrapleural pneumolysis, when properly performed, is scarcely more discommoding to the patient than aspirating fluid from the pleural cavity,—neither is it shocking, and it is seldom painful. Often a cavity that has been open for months (sometimes years) closes within a few weeks and expectoration ceases following this operation, hence, in many instances other more radical surgical procedures are unnecessary. For cutting adhesions we prefer the Bovie high-frequency unit, employed according to my technic, which has been previously described at considerable length. By this method the incidence of empyema is less than 2 per cent, while it is approximately 20 per cent with the galvanocautery.

In our series of 250 cases operated upon, approximately 60 per cent were technically and clinically successful. The unsuccessful cases comprise those where adhesions were found unsuited for operation.

Following operation, exudate will occur in the pleural cavity in about 3 per cent of the cases, and empyema in less than 2 per cent. We have had no deaths directly due to operation.

PHRENIC NEURECTOMY (Phrenicotomy)

When the surgeon is confronted with an unsuccessful pneumothorax and inoperable adhesions, phrenic neurectomy should be undertaken. The phrenic nerve is exposed through a 2 cm. incision made above the clavicle in the subclavian triangle. It is sectioned and 8 to 10 cm. of the distal part extracted. The operation is performed under local anesthesia.

Because of the ensuing paralysis following phrenic neurectomy, the diaphragm gradually rises into the chest, reducing the lung correspondingly in size, thus,

even apical cavities often close after this simple procedure

In our series of over 500 phrenic operations, more than 15 per cent of cavity cases have healed, thus excluding more radical measures. The indications for phrenic neurectomy cannot be individualized in this publication, but the most important ones are as follows

1 In pulmonary tuberculosis where artificial pneumothorax is indicated but introduction of air is thwarted by pleuritic adhesions

2 As an accessory to artificial pneumothorax where a suitable lung collapse is prevented by adhesions inappropriate for operation

3 In tuberculous empyema to reduce the size of the pleural cavity and lessen the area of infection

4 As a preliminary to every thoracoplasty to serve as a test of the soundness of the opposite lung, as well as to reduce the amount of rib necessary to be removed. Often a thoracoplasty is needless after this procedure, or, if necessary, the patient is made a better surgical risk. Ordinarily, three to five months should elapse after a phrenic neurectomy before a thoracoplasty is decided upon, as that length of time will determine its value

EXTRAPLEURAL THORACOPLASTY

When the above measures to secure sufficient lung collapse have proved disappointing, a paravertebral extrapleural thoracoplasty should be considered. Next to artificial pneumothorax, it is the most valuable method of collapsing the lung, but contraindications for operation are more stringent for thoracoplasty than artificial pneumothorax. Poor surgical risk cases must be excluded, also, disease in the opposite lung must be of minimum extent and absolutely quiescent or healed

In a unilateral pulmonary tuberculosis—preferably of the fibroid type, with or without cavity formation—thoracoplasty is indicated provided artificial pneumothorax and phrenic neurectomy have been given a trial and proved unsuccessful

Before operation, the patient is specially prepared, including the psychic prepara-

tion. He is assured that the operation is not dangerous, painful, nor mutilating when properly performed

The operation is, preferably, performed under light ethylene anesthesia, combined with local anesthesia. A complete thoracoplasty must be done in two or more stages, depending upon the case. The ribs are sectioned close to the spine, and in some cases of limited upper lobe disease, the resection of the upper five or six ribs only may suffice. If large cavities exist in the upper lobe, it is advisable to sever the anterior portions of the upper four or five ribs near the sternum, an incision being made from the axilla downward. Owing to the brief period required for osteogenesis, the second and, if necessary, subsequent operations should follow the first as soon as possible before this formation, as rigidity of the chest wall interferes with the collapse. To restore shoulder movement and prevent deformity, shoulder exercise and rest in a thoracic hammock are carried out as soon as possible. Following operation, three months rest in bed is obligatory. The final outcome will depend greatly upon the after-care, therefore, it is essential that only nurses who understand both the medical and surgical treatment of tuberculous patients be in attendance

RESULTS

In our series of 150 thoracoplasties, upon whom 355 operations have been performed, the total recovery was 66.1 per cent, the total dead, 21 per cent. But, only 1.53 per cent (2 cases) died from causes directly due to operation. Death in the other instances was caused by intercurrent disease, progressive tuberculosis in the intestines, in the same lung, or, in some cases, in the opposite lung

I have previously stressed the prime importance of a background of experience and special training in tuberculosis before attempting these operations, but when that is attained, they are not difficult to execute and should be utilized to the limit of their indications

The Place of the Sun in Treating Tuberculosis

TO AVOID any misunderstanding we should like to state that what we have to say here regarding Heliotherapy has to do wholly with *Natural* and not *Artificial* heliotherapy and it applies only to the direct use of the sun's rays—not their indirect or reflected use as occurs in so-called sky-shine administration or air baths

Our interest in heliotherapy was first awakened many years ago after some study of the work of the Danish physician Finsen and a personal knowledge of the work of Dr J W Kime, an American physician, who started his valuable pioneer experiments in 1898. For some reason, which we are at a loss to explain, Dr Kime's work has never been properly acknowledged in medical literature (1). It was, however, Rollier's book "*Die Heliotherapie der Tuberculose*" published in 1913, that gave impetus to our own work in heliotherapy.

Although beginning the use of sun in the treatment of tuberculosis with caution, it did not require long to learn from experience that heliotherapy held many complex problems not mentioned by Rollier or the other early workers. These complexities were especially marked in the extrapulmonary cases with pulmonary lesions and in the uncomplicated pulmonary cases. Having always under our care several hundred tuberculous patients, (with pulmonary cases greatly predominating) it has been possible to use sunlight in treating practically every type of case for 20 years.

The value of this therapeutic agent was evident from the beginning, however, the harm that it could do to a patient was not entirely realized until sometime later (2). As soon as the latter was realized, it was at once recognized what a big problem lay in differentiating between the patients who would be helped and those who would

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be definitely harmed by sun treatment. Technique, we discovered was not the answer, although it is a most important factor in the successful use of the sun, after cases have been properly selected.

For some time this problem of selecting cases seemed unsolvable but finally a scheme was evolved which developed into a plan for the proper selection of cases which has been followed for many years with most satisfactory results. It is perhaps best shown in a chart—(See below). It might be said here that since this classification of tuberculosis was evolved for heliotherapy—no essential change in it has been found necessary—except that fewer and fewer cases of the productive types of pulmonary tuberculosis have been given sun as the years have passed.

Even in those cases where the sun can be of great value, it is in no sense a specific cure for any manifestation of tuberculosis. Rest, good food, and fresh air, are still the fundamentals in treating all forms of the disease, and the sun, where it should be used, is only a valuable adjunct.

Not Used In Pulmonary Cases

With reference to pulmonary patients who were given sun, these salient facts stand out too often: the treatment was detrimental, and only the constant vigilance of the doctor, employing both the stethoscope and the x-ray, and watching their general condition most carefully, enabled these patients to stop the treatment before being irreparably harmed. This situation frequently prevailed even when the sun was prescribed in very small doses with the most careful attention given to technique. The damage produced is sometimes so insidious and rapid that a patient can become seriously ill as a result of this treatment, even before it is realized.

As recently as 1928, we prescribed sun to occasional selected pulmonary cases of the productive type of tuberculosis (3). Some years prior to that, a much higher percentage of such cases were getting sun. These cases were always carefully chosen, were always of the productive type and were always patients whose condition was not improving or stationary on ordinary methods, and to them the sun was administered with the utmost care in technique. Our more recent experience, however, has demonstrated to our satisfaction that the danger of heliotherapy even under these circumstances is too great to justify its use and so now we have abandoned it. We feel, very decidedly, that the advantage to be gained in an occasional case is far outweighed by the danger and we now never use sun in any case of uncomplicated adult pulmonary tuberculosis. We have rather regretfully come to this conclusion after a careful analysis of our experience.

Valuable in Extrapulmonary and Childhood Tuberculosis

The benefits of heliotherapy in most forms of extrapulmonary tuberculosis are rather well known. With its use there is no longer need for many of the surgical operations formerly performed, as for instance laparotomy in tuberculosis of the peritoneum, radical removal of tuberculous glands of the neck, knee joint resections, et cetera. Indeed, one can say that in tuberculous peritonitis heliotherapy seems to be almost a specific. This can also be said about quartz light therapy in tuberculous enteritis.

Perhaps the most outstanding exceptions to the general benefit of sun treatment in extrapulmonary tuberculosis are tuberculosis of the kidney, eye, middle ear and larynx. If tuberculosis of the kidney is discovered while the disease is still confined to one side a nephrectomy should be done at once in the great majority of cases to be followed by prolonged bed rest and heliotherapy. In cases of frank bilateral involvement of course no surgery can be done and the outlook is very bad under any treatment. However, an occasional

case seems to recover with prolonged bed rest and general heliotherapy—so it should be tried. In tuberculosis of the epididymis early surgical removal of the epididymis alone followed by heliotherapy is the method of choice. We believe best results in tuberculosis of the eye are obtained with tuberculin, having been convinced of this by the brilliant results obtained by Dr. Stark of El Paso, Texas, years ago. We have never seen any good results in tuberculosis of the middle ear from heliotherapy and do not use it any more. We are inclined to think that not enough surgery is done in this type of tuberculosis and have been very much impressed with a recent paper on this subject by Irving Muskat (4). After several years' trial of heliotherapy in tuberculous laryngitis we have been impressed neither by its general or local use.

In the surgical treatment of extrapulmonary tuberculosis it is too frequently the practice to depend on surgery alone to effect a clinical cure. We feel that when surgery is necessary, it should be combined with heliotherapy and other accepted therapeutic measures and never depended on alone, because tuberculosis of whatever tissue or organ is always only a local manifestation of a general condition.

In hilum tuberculosis—so-called childhood type—sunlight is practically always beneficial and usually effects a clinical cure when combined with proper rest. In this classification, however, we refer not to the primary complex or initial infection of tuberculosis in the lungs but rather to the smoldering infection in the tracheobronchial and hilar glands, which is secondary to and often persists long after the primary infection is clinically healed. We have had no experience in using heliotherapy in the initial tuberculous infection, believing that sunlight is contraindicated as long as there is any evidence of unhealed pulmonary lesions involving the parenchyma of the lung.

The application of heliotherapy has been rather thoroughly discussed in a previous publication (5).

Suffice it to say here that each case should be thoroughly individualized. Patients' reactions to sunlight differ quite as much as their physical appearances. Generally, however, blonds are much more susceptible than brunettes, and titian blonds are particularly sensitive. One often despairs of ever obtaining an appreciable tanning of the skin in those having the fair skin accompanying hair with a reddish tinge. While the benefit of heliotherapy is not always proportionate to the degree of pigmentation resulting therefrom, the result to be desired should always be a marked tanning—burning of even the slightest degree is always to be avoided.

For practical purposes as far as heliotherapy is concerned all tuberculosis can be classified as follows:

Extrapulmonary

Without pulmonary lesion Class 1

With pulmonary lesion Class 2

Pulmonary (Infection of lungs and tracheobronchial glands)

Proliferative

Childhood type (tracheobronchial glands) Class 3

Adult type (lungs) Class 4

Exudative Class 5

The indications follow:

Class 1—To use sun treatment in all cases

Class 2—To use sun treatment in all cases, but be careful to avoid reactions and be especially careful in exposing the chest

Class 3—To use sun treatment in all cases

Class 4—To not use sun treatment. Dangerous—Benefit to be obtained does not justify risk of harm

Class 5—To never use sun treatment

Summary

Heliotherapy is not indicated in all cases of tuberculosis. The majority of patients with this disease should never use it. In general one may say direct sunlight is indicated in cases of extrapulmonary tuberculosis and contraindicated in cases of pulmonary tuberculosis. It is not a sure cure for any type of tuberculosis, but is often, especially in some of the extrapulmonary cases, a very valuable—or even necessary—aid. Since it is not in itself a cure, it should never be used routinely or to the exclusion of the usual standard therapeutic measures of rest, fresh air and good food.

It should never be forgotten that the direct rays of the sun are extremely powerful, and that, carelessly administered, they can do great harm. Direct sunlight, in the same amount, affects patients differently—especially in the beginning of its use, than almost any other remedy with which we are familiar. It must be used, therefore, in every case, not according to any hard and fast rule, but according to the individual reaction.

It is of the greatest value, and may be practiced with the least chance of doing harm in pure extrapulmonary tuberculosis, that is, in the so-called surgical tuberculosis without pulmonary lesion. It is of great value in extrapulmonary tuberculosis with coincident pulmonary lesion, but in giving it here one must be far more careful than in the uncomplicated surgical type.

It is of great value in hilum gland tuberculosis, and in this type should invariably be used.

It may be of some value in an occasional case of the proliferative type of pure pulmonary tuberculosis, but here it must be employed with the greatest caution, lest it transform a favorable, stationary, or healing lesion into a rapidly progressing and fatal one. Ordinarily the benefit to be expected from its use is too slight and the danger is too great to justify the risk.

It is never of value, and is usually actually harmful, in the exudative type of pure pulmonary tuberculosis, as well as in all acute types, and in such cases, therefore, it ought never to be used.

Finally, whenever heliotherapy is used in tuberculosis the patient should always feel as well, or better, both during and after his sunbath, if he does not, it should be discontinued, for this means danger.

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Coexistence of Pulmonary Tuberculosis and Hyperthyroidism and Its Significance

MY ATTENTION has been drawn to the coexistence of pulmonary tuberculosis and toxic goiter by the fact that

in the past several years I have been struck by the increasing number of my tuberculous patients who have had a synchronous intoxication of the thyroid, and vice versa

As I delved into the recent literature, I found it exceedingly scanty, but with the opposite view that pulmonary tuberculosis and toxic goiter do not coexist, or rarely coexist, as a prevalent opinion. As I looked back over the literature of twenty years ago, especially European literature, I found my own views quite generally confirmed

If we exclude symptoms directly referable to the lungs we find that these two diseases have essentially the same symptom complex, for instance, the cardiac disturbances, sweats, the lack of endurance, loss of weight, exophthalmos, psychic instability, tremor, nervous irritability, insomnia, gastro-intestinal disturbances, lymphocytosis, and even temperature. There is an interesting difference of opinion in the literature on the temperature phase. One group including Moebius, says there is no fever in toxic goiter, while another large group insists that slight elevation of temperature may be present. In fact, Moebius and his school declare that if temperature is present in exophthalmic goiter there is a coexisting tuberculosis.

Steck (1), a European writer, in 1921 pointed out that both diseases presented many of the same symptoms, in fact, most of the clinical symptoms were the same. He concluded that since both diseases have the same symptomatology, they both have the same etiology. He cited various animal experiments where the two diseases acted the same. He quoted Brandenstein (2) in this article, who even goes so far as to

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treat exophthalmic goiter with tuberculin with benefit. It is a curious thing, that before I had read this article, I had

also administered tuberculin with benefit in a case of coexisting tuberculosis and exophthalmic goiter.

We are all acquainted with the enlargement of the thyroid in many acute infections. This enlargement also occurs in early tuberculosis. Various writers have given this percentage as ranging from twenty to forty percent. In other words, this is a defense reaction and results in increased thyroid secretion. Why cannot we explain this process as a neutralization reaction? Nature does just this thing.

Steck, quoted above, goes still further in explaining the similarity of the symptoms of the two diseases. He says that exophthalmic goiter is a special type or phase of tuberculous infection. After all, we do not know that Basedow's disease is not due to some infection.

One of the early writers on this subject was Bialokur (3), who in 1910 was the medical director of a large Red Cross tuberculosis sanatorium in Yalta, Russia. He says that the coincidence of the two diseases is not as seldom as ordinarily considered, and reports fifty-five cases occurring in his institution. He even cites a particular type of individual who has both diseases present. This type is called the Bryson type for an American who first called attention to the tuberculous habitus in toxic goiters. Bialokur concludes that Basedow symptoms are often an expression of a tuberculous infection and that the treatment of Basedow's disease reacts favorably in tuberculosis.

Brandenstein (2), in an exhaustive article, found that twenty-eight and one-half percent of the women and twenty percent of the men had coexisting tuberculosis and thyroid intoxication. This is interesting when we compare these percentages with

those of Moebius, who found that two percent of all the sick had goiter. This would indicate that the tuberculosis are hypersusceptible to toxic goiter. She concludes that the frequent coincidence of tuberculosis and exophthalmic goiter in a tuberculosis sanatorium is not an accident. She asks two questions, first, does thyroiditis arise from an independent toxin or from the tubercle bacillus, and second, why do some tuberculous have goiter symptoms and others not at all?

Saathoff (4), who is the head of a large neurological sanitarium in Germany, reports forty-five cases of toxic goiter in which only one was free from tuberculosis. Practically all of these made a favorable recovery. Many cases reacted well to tuberculin treatment. He propounds the interesting question whether the increased libido in the early tuberculous might not be due to increased thyroid secretion. He found every tuberculosis relapse due to a concomitant exacerbation of goiter. He concluded that in every case of toxic or suspicious goiter, tuberculosis should be considered.

Sloan (5), an American writer with a wide surgical experience, feels that the rather frequent coexistence of tuberculosis and goiter is not sufficiently appreciated.

Case Reports

A. H., 32 years, came to me in June 1920 with tuberculosis. Her mother died of tuberculosis at 86 years. Her father, a physician, died of angina pectoris at 61 years. Otherwise the family history was unimportant. The patient was never strong. She had infantile paralysis at 12 years from which she fully recovered. Her chief complaint was weakness. Her weight was 99, temperature 99.2, blood pressure 156/78 and pulse 100. She had plus 2 albumin. Physical examination showed a few rales after cough over both apices. Rales over the left apex have persisted up to the present time (January 1933). With time the albumin disappeared. Pulmonary symptoms gave no difficulty after two years. Blood pressure rose to 170/94. Her basal metabolism in June 1926 was plus

20. She had a thyroidectomy performed in September 1931, but received practically no benefit from this operation. She had one to two degrees of temperature practically the whole thirteen years since I first saw her. She has never cooperated very well, but she never had another breakdown from tuberculosis, which I attribute to the defensive toxic goiter.

A. B., age 25 years, was first seen April 1931. Family history was negative. She came because of persistent cough. She has hay fever every summer, otherwise history was negative. Sputum was negative. After cough there were rales over the right apex. There were one or two degrees of fever which persisted for one year. There was a slight enlargement of the thyroid gland, but no symptoms developed until October 1931, when her basal rate was found to be plus 38. Blood pressure was 154/60, pulse 100. She had an appendectomy in November 1931. She was put on rest, diet and medical treatment including Lugol's, sedatives and suprarenal extract, and an occasional dose of insulin. The insulin finally overcame the temperature when no other antipyretics were of any avail. The patient was totally disabled for one and one-half years, when she started to do light work. At this time the lung signs had cleared, temperature was normal, pulse 90, and basal rate was plus 7. She is still somewhat weak, but is improving and is working every day.

Conclusions

I am of the opinion that the coexistence of tuberculosis and toxic goiter is of much more common occurrence than is ordinarily believed. There should be a more general use of the basal metabolism apparatus in the tuberculous. Every suspicious case of tuberculosis should have this test made, also every evident case. On the other hand, in every case of exophthalmic goiter tuberculosis should be carefully eliminated. Greater attention to the thought that these two diseases occur together will prove to every student their more frequent coincidence.

In most cases of early tuberculosis there

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The Advantages of Sanatorium Treatment

WHEN THE diagnosis of tuberculosis is made, the question at once arises whether the patient will take the cure

at home or go to a sanatorium. In the post-war years there has developed a very definite tendency toward the "home treatment" of tuberculosis. This tendency has been intensified since 1929, the economic stringency proving a potent argument and one well-nigh unanswerable.

Why such opposition to sanatorium treatment in tuberculosis? Why the argument that the entire cure sums itself up in "bed-rest," and the patient can do this just as well at home as away and in many instances far more comfortably? Evidently the wish is father to the thought.

The same line of reasoning does not present itself in the face of human ills of

a different nature. An acute appendix requires hospitalization and no questions asked. But, it will be said, this is a surgical condition and surgical conditions should be hospitalized. Granted, by all means. The implied corollary that medical should *not* be hospitalized does not, ever, hold true. All cases of diabetes should be hospitalized until their blood sugar, if necessary, insulin dosage are determined and stabilized. The arthritic often finds a prolonged period of institutional beneficial. The case of lobar pneumonia, of gastric ulcer (treated by rest), of congestive heart failure, of glaucoma, of exophthalmic goiter, of epilepsy, best in a hospital. The nervous case is recognized universally as best treated in an institution for the proper management and treatment. Why does the suffering of tuberculosis, and why tuberculosis, so often fight treatment in an institution for "bed-rest"—it is because tuberculosis is because tuberculosis

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quarantined looked upon as a disgrace rather than as a misfortune, and it is because people are fearful that entering an institution for the treatment of this disease forever brands them as "unclean." A high time that an intelligent citizen cast such ideas, based on prejudice, into limbo. What are the advantages of sanatorium treatment?

First, the patient is placed under conditions that make it easy for him to take the cure. Everyone round about is doing the same thing at the same time. He has the right to step out of line to do the thing, he is one of a number swimming with the tide instead of being, at the time, the sole individual trying to follow a line that is foreign to all his as-

Second, the patient is relieved from and business worries. In the institution, away from home, he cannot share his petty domestic worries which tend to make his nervous system already taut from physical disease. The telephone is not at his elbow, the office cannot call up to ask him to drop in on the way home to discuss the happenings, for better or for worse, at the place of business. It must be borne in mind that mental rest is just as important as physical rest in the management of the tuberculous, and that oftentimes an individual who is lying quietly in bed and obeying implicitly the letter of the law is disobeying the spirit thereof, because his mind is running like a mill-race due to the carping cares that he cannot set aside.

Third, the patient is free from the gratuitous advice of well-meaning friends. At home, unless the invalid is acutely ill, they are bound to invade the sick-room and, with their kindly comments and criticisms, to kindle doubts and wonderings in the sick-man's bosom—doubts which he

will pore over in the silent watches of the night and which will leave him querulous, unstrung and distrustful in the morning

Fourth In the sanatorium, by association with nurses and with other patients, the newcomer will learn much about his disease that he can never acquire at home. It is a homely saying but a true one that "misery loves company," people treading the same road toward the same goal like to walk in step—it helps!

Fifth If something goes wrong, such as a small, or even large, hemoptysis, the attendants in an institution are prepared and ready to deal with it promptly and properly, and by their very coolness and manner-of-factness allay the natural terrors of the patient. It must be remembered that there are but very few individuals who have the means at their command to enjoy the services of a private nurse over a period of months.

Sixth The transition from health to invalidism is not so shocking. In the sanatorium illness is taken as a matter of course. Put to bed at home the patient sees the parade of life—his parade—marching past his window while he is left staring after it, unable to participate.

What are the disadvantages of the sanatorium? Really none that I can see. To be sure, there are certain individuals so constituted that they cannot (or more properly *will not*) enter an institution. Their decision, however, far from being a snub at the institution, rather puts them on the defensive. The very rich and the very 'persnickety' will probably at all times determine to remain without the walls, but for the 'run-of-mine' of patients, there is no better environment, no more stimulating entourage and no finer combination of all the forces making for recovery than those offered in a sanatorium where expert medical attention is available, and one run with a heart as well as with a head. Dr. Trudeau showed us this many years ago. Hundreds have emulated his example. Tuberculosis is a disease from which one can recover, the sanatorium is the shell which the patient should inhabit in order to achieve the best results, and the combination of the devoted sanatorium personnel with the earnest cooperative patient provides the best combination for the return of health.

COEXISTENCE

(Continued from page 22)

are symptoms of toxic goiter and when these are of mild degree they are attributed to tuberculosis. If the Basedow symptoms are marked in conjunction with tuberculosis the slight pulmonary involvement is attributed to bronchitis.

In my experience these cases have all done well. I am interested in the explanation of this phenomenon and am of the opinion that the tuberculous individual in the early stages I and II who has a moderate enlargement of the thyroid, has a resulting good defense reaction.

Steck, quoted above, frequently sees tuberculosis aggravated after thyroidectomy. I see no reason for thyroidectomy when the modern medical treatment of toxic thyroid gives such brilliant results. Both tuberculosis and toxic goiter respond to the same treatment interchangeably. I have found that tuberculin is of benefit in exophthalmic goiter. Sometimes the accompanying fever is most obstinate. I have found where these two diseases coexist, the fever is more refractory than in the ordinary case. The treatment is rest but in one case on account of the small tuberculous involvement I was discouraged by the length of time it took to reduce the temperature. I was finally rewarded by giving only a half dozen small doses of insulin.

The newer, non surgical ways of treating exophthalmic goiter by adding diet and suprarenal extract to the rest regime have already been pointed out in a previous article (6). This is not only much more rational but is bound to be the treatment of the future. Last but not least, it eliminates an unsightly and unnecessary scar and avoids a surgical shock which is distinctly contraindicated always in pulmonary tuberculosis and often enough in exophthalmic goiter.

One observation which I have made and which I have not seen mentioned anywhere is in regard to the co-existence of advanced tuberculosis and toxic goiter. This is of infrequent occurrence but when it does take place, in my experience there is exhibited the most rapidly fatal type of infection. I have ever seen the defenses broken down and no treatment is of avail.

(1) Steck H.—Recherches experimentales sur les relations hypothetiques entre la maladie de Basedow et la tuberculose—Schweizerische medizinische Wochenschrift No 23 1921

(2) Brandenstein Hedwig—Basedow—Symptome bei Lungentuberkulose Berliner klinische Wochenschrift No 39 1912

(3) Bialokur F.—Basedow—Symptome als Zeichen tuberkulöser Infektion und ihre Bedeutung fuer Diagnose und Therapie der Lungenschwindsucht—Zeitschrift fuer Tuberkulose XVI No 6 1910

(4) Saathoff, L.—Thyreoese und Tuberkulose Muenchener medizinische Wochenschrift No 5 1913

(5) Sloan E. P.—Tuberculosis and Goiter Journal of the American Medical Association, June 18 1927

(6) Minnig Arnold—The Medical Treatment of Exophthalmic Goiter Medical Journal and Record January 4, 1933

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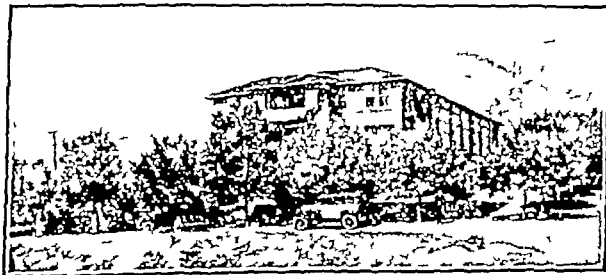
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ABSTRACTS



This department is devoted to abstracts of articles carefully and judiciously selected by the Editorial Staff

RINGER, DR. PAUL H. Diagnostic Points in Pulmonary Tuberculosis. Southern Medical Jour Vol. 28 No 2 Page 178 February, 1935

Ringer stresses the importance of "getting back to fundamentals" and emphasizes the necessity for the profession to become more tuberculous minded and better qualified for early diagnosis, stating that 56% of a 300 series applying for treatment were in the third stage of the disease

Much of the delay in diagnosis is due to patients who go from two to six months with active symptoms before seeing a physician. Too many who consult a physician early get a wrong diagnosis or no diagnosis at all, with undue consideration to hemorrhage and cough

Ringer quotes Lawrason Brown's aphorism, "Symptoms tell what is happening." He calls attention to the importance of careful history and painstaking inquiry into symptoms for the correction of mistakes that are being made in the latter days

Ringer emphasizes the importance of repeated sputum examinations and the importance of repeated negatives. His statement that ex-rays reveal only differences in density and the importance of interpretation is modified by the clinical conditions of the person whose film is being studied. He calls attention to idiopathic sero-fibrous pleurisy in connection with the disease. He enjoins us to bear in mind four things if we would miss but a few cases.

- (1)—Think of tuberculosis as an ever-present possibility
- (2)—Secure a careful history and an equally careful list of symptoms
- (3)—Examine sputum
- (4)—Take x-ray

ZANNELLI, Carlo. Illustration of a Case of Double Phrenic on Both Sides. Illustrazione di un caso di doppio frenico, bilaterale. Lotta contro la tuberc. 4 979

The author studies the anomalies of the phrenic nerves, of both origin and course, and describes the following case. In a right-sided pulmonary tuberculosis in which pneumothorax was unsuccessful because of adhesions, right phrenicectomy was performed. The diaphragm rose and became immobile. The operation was followed by clinical improvement which lasted two months. At that time tuberculosis spread appeared in the middle field of the left lung, and at the same time the right diaphragm was found to be perfectly mobile again. Pneumothorax was induced in the left side followed by phrenicectomy on the same side. During the operation it was found that the phrenic was represented by two nervous branches of equal size, both situated in the anterior surface of the left scalenus anticus, which was avulsed. After a short time the right tuberculous lesion progressed, and a second right phrenicectomy was deemed advisable. At the operation a second phrenic trunk was discovered on the posterior surface of the scalenus anticus, which was avulsed. Both diaphragms became permanently paralyzed. The author reports that this was the only case of bilateral double phrenic in 500 phrenicectomies.

ELLISON, E. L. and McLAUGHLIN, CHAS. Post-operative Pulmonary Complications. Surg. Gynec. Obst. 55 716

Postoperative pulmonary complications as to theories and etiology are discussed. Anesthesia was found to have little influence on complications except in prolonged anesthesia.

Infections of the upper respiratory tract existing at the time of operation proved a definite factor in influencing postoperative complications.

Operations on the stomach, duodenum, jejunum, gall-bladder and appendix were most prone to be followed by pulmonary complications. Pulmonary complications with the highest mortality occurred between twenty four and forty eight hours and between the months of November and March.

These studies were based on a series of seven thousand three hundred and twenty six operations in which there were one hundred and twenty postoperative pulmonary complications with thirty nine deaths. In the above number of operations there were no gynecological, urological, neurosurgical or otolaryngological cases included.

The main prophylactic measure discussed was to make a rule never to operate when there existed upper respiratory infections only in dire emergencies.

DR P B MATZ Effect of Intercurrent Disease on Pulmonary Tuberculosis U S Veterans Bureau, Medical Bulletin 3 975-1088 Page 988

Matz shows that of 123 patients with pulmonary tuberculosis in whom there was an intercurrent respiratory disease, 20.33 per cent were discharged with the disease arrested, apparently arrested or improved, while 74.79 per cent died. These figures

may be compared with those in 3,605 patients with pulmonary tuberculosis and without respiratory complications, of whom 40.61 per cent were discharged with the disease arrested, apparently arrested or improved, and 50.40 died. Of 1,095 patients with pulmonary tuberculosis without complicating intercurrent disease, 42.92 per cent were discharged with the disease arrested, apparently arrested or improved, and 48.40 per cent died. The patients with pulmonary tuberculosis without any complicating intercurrent disease received an average period of hospitalization of 246 days, and those with pulmonary tuberculosis with an intercurrent non-respiratory complicating disease had the longest period of hospitalization, namely, 266 days.

Malaria and Tuberculosis Journal of Tropical Medicine and Hygiene, London

Frieman records the observation that, in districts where malaria is endemic, patients clinically free from signs of tuberculosis, often after having contracted malaria, suddenly showed an acute tuberculous development. On the other hand, the consumptives with malarial infection gave exacerbations sometimes with a fatal termination.

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QUERIES AND ANSWERS



Careful attention given to all queries
 Names will be omitted if so desired
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Q When should the fluid in a case of pleurisy with effusion (tuberculous) be removed?

A. Only when the following symptoms prevail: High fever, marked dyspnea, impaired heart action. These symptoms may prevail at the outset and subside in a short time. In allowing the fluid to remain in the absence of the severe symptoms above described, the patient will be materially benefitted. However, if the above symptoms prevail aspiration should not be delayed too long.

Q What is the most positive diagnostic sign in pulmonary tuberculosis?

A. The presence of tubercle bacilli in the sputum. However, a positive diagnosis can be made without the presence of tubercle bacilli in the sputum by careful history taking, physical and x ray examination.

Q What are the most important factors in the cure of tuberculosis?

A. It was once thought that fresh air was the first most important, food second, and rest last. We now realize that the reverse order is correct, that is to say rest first, and fresh air last. However, these three must go hand in hand.

Q How many cases of tuberculosis are there in the United States?

A. The latest estimate gives one and one half million.

Q Is tuberculosis more prevalent among whites or negroes?

A. Tuberculosis is four times as prevalent among negroes.

Q What are the classifications in pulmonary tuberculosis?

A. *Minimal (incipient)* Slight lesion limited to a small part of one or both lungs, no serious tuberculous complications.

Moderately advanced A lesion of one or both lungs, more widely distributed than under minimal, the extent of which may vary according to the severity of the disease, from the equivalent of one third, the volume of one lung, to the equivalent of the volume of an entire lung with little or no evidence of cavity formation. No serious tuberculous complications.

Far advanced A lesion more extensive than under moderately advanced. Or definite evidence of marked cavity formation. Or serious tuberculous complications.

Q How are the symptoms of pulmonary tuberculosis classified?

A. a. (slight or none) Slight or no constitutional symptoms, including particular gastric or intestinal disturbance or slight loss of weight, slight or no elevation of temperature or acceleration of pulse at any time during the 24 hours. Expectoration usually small in amount or absent. Tubercle bacilli may be present or absent.

b. (moderate) No marked impairment of function either local or constitutional.

c. (severe) Marked impairment of function, local or constitutional.

Q When is a patient apparently cured?

A. When all constitutional symptoms and expectoration with bacilli are absent for a period of two years under ordinary conditions of life.

Q When is a patient termed arrested?

A. When all constitutional symptoms and expectoration with bacilli are absent for a period of six months, physical signs to be those of a healed lesion, Roentgen findings to be compatible with physical signs.

Q When is a patient quiescent?

A. When there is an absence of all constitutional symptoms, expectoration and bacilli may or may not be present, physical signs and Roentgen findings to be those of a stationary or a retrogressive lesion, the foregoing conditions to have existed for at least two months.

Q How long does it take for a patient to make a cure of pulmonary tuberculosis?

A. This depends on many factors, but more specially on the stage of the disease. Early cases of pulmonary tuberculosis requiring only a few months with proper care while patients with cavitation require a much longer time. The attitude of the patient is a vital factor. Patients rarely arrive at a cure unless they give hearty cooperation by following the advice of the physician with reference to rest, exercise, food and general behavior.

Q Is it better to take treatment for tuberculosis at home or in an institution?

A. While it is possible to take care of persons at home, the most certain control of the patient occurs when he is in a suitable regulated institution.

Q Is pleurisy with effusion to be taken as definite evidence that the patient has pulmonary tuberculosis?

A. Pleurisy with effusion without other obvious causes, such as acute lobar pneumonia, acute bronchial influenza or trauma may be taken as definite evidence that the patient has pulmonary tuberculosis. However, this rule will not apply in dry pleurisy or pleural exudates or transudates due to cardiac, cardio-renal, or malignant disease.

Q What are the physical signs of the healed lesion?

A. These physical signs may embrace every physical sign of infiltration and consolidation, with the exception of rales. There are no certain criteria of a healed lesion and this answer has its exceptions.

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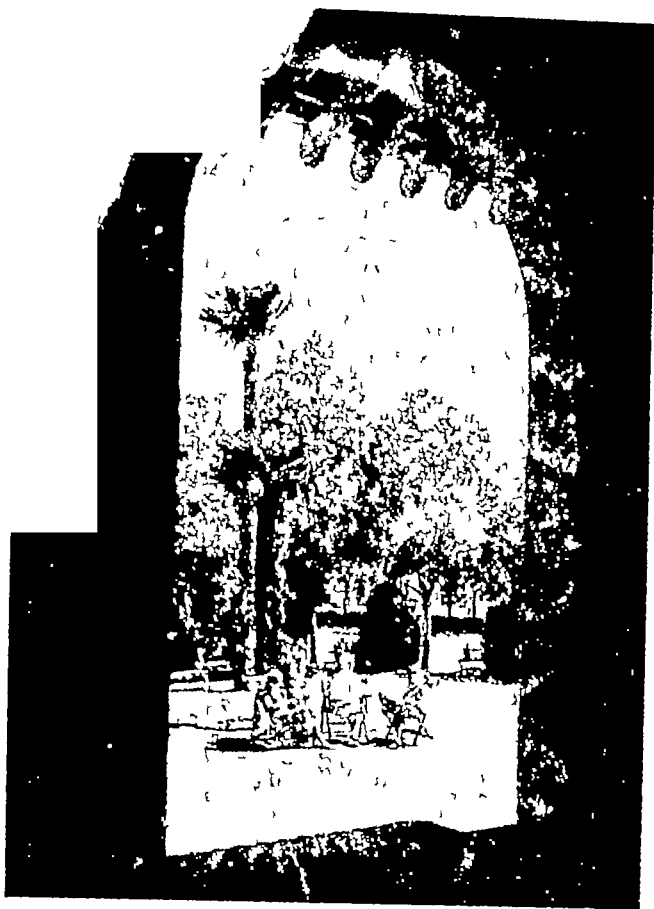
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C. E. ATKINSON, M. D. ----- *Medical Director*

THE impression made by the first issue of DISEASES OF THE CHEST far exceeded our expectations. Ten thousand copies were mailed to representative physicians throughout the United States. Their voluntary letters of appreciation have been more than gratifying. I am giving below quotations from some of these letters, which exemplify the expressions of all our friends who have written.

Dr. Edw. S. Bennett, Los Angeles, California, says:

"Please accept my sincere and hearty congratulations on Volume I, Number 1, of DISEASES OF THE CHEST. All articles were timely, concise and to the point. There is a great need for a journal in the right price range and at the proper size, dealing with the diagnosis, treatment, management and mismanagement of Diseases of the Lungs, that will reach, and be read by, the General Practitioner. If the subsequent issues of DISEASES OF THE CHEST maintain the standard as shown in the first issue, you have started on its way to success as a medical journal, which I am sure will be greatly appreciated."

"Here is wishing you and the other editors all the support and commendation you deserve."

Dr. Champneys H. Holmes, of Atlanta, Georgia, writes:

"I received the first issue of DISEASES OF THE CHEST and on this same mail am sending in my subscription for same. I am very happy to see the advent of this publication as I believe it will serve a most useful and timely purpose."

"I am one of the few men in this section who limits his work strictly to diseases of the chest and naturally this publication will hold a strong interest for me."

Foreword

BY

C. M. HENDRICKS, M. D.
El Paso, Texas

"If at any time it would be desired that I contribute an article from the viewpoint of a city chest consultant, it will be my pleasure to do so."

"With repeated best wishes for the success of this undertaking, I remain"

These expressions will go far in encouraging us to maintain DISEASES OF THE CHEST on a high plane and make it more interesting and instructive to all concerned.

The Federation of American Sanatoria feels that we have a great work to do and if our efforts meet with continued success we will be well repaid for them.

We again invite our readers to make use of the Queries and Answers column. Send us any problems concerning diseases of the chest and we will endeavor to explain any question within our power.

We are convinced that the physician in the field has numerous problems that arise in his dealings with tuberculous patients, especially at this time, during

the economic stress with all its complexities. It is the hope that the Federation of American Sanatoria will be especially helpful now, as at no time in the past decade has tuberculosis assumed a more menacing aspect, especially in the rural communities. These rural communities are largely infected with the disease, this being attributed to the many unsegregated open cases and the large number of persons sleeping in one room without the necessities for cleanliness, and with little food.

So to all physicians interested in tuberculosis, the Federation of American Sanatoria offers its services through DISEASES OF THE CHEST.

WE WANT TO HELP



To meet the problems that the general practitioner finds in dealing with his tuberculous patients and those that confront him in the early diagnosis and treatment of these cases, the Federation of American Sanatoria hopes that this Journal will be of material aid. The technical articles presented within its pages are contributed by men who have devoted their lives to the study of the disease.





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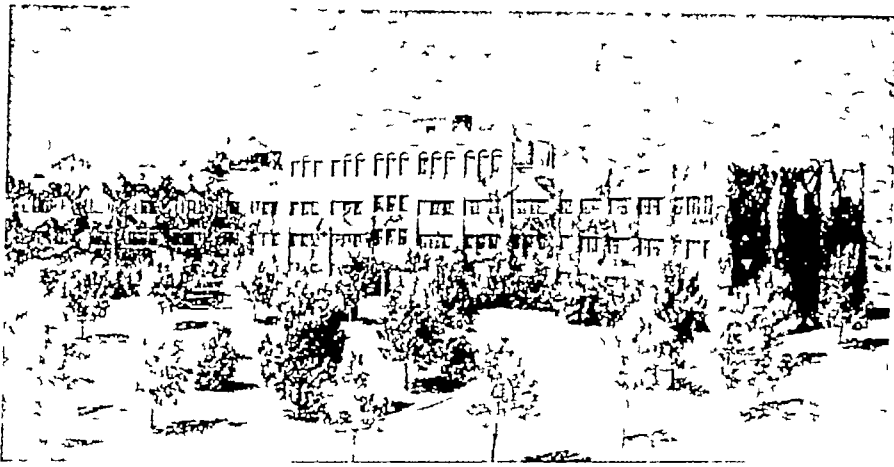
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C. M. HENDRICKS EDITOR IN-CHIEF

(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"
 Lawrason Brown, M D

Editorial Comment

The Prevention of Tuberculosis in Children AUTHORITIES AGREE that children are born free from tuberculosis and that infection, if it takes

place at all, occurs after the child is born. It is likewise known that infants and young children are very easily infected by close association with active cases of tuberculosis. To prevent infection, then, in the very young, the first principle to follow would obviously be, to keep the child away from persons who have active tuberculosis. This is simple enough in an ordinary home where there are no tuberculous individuals, while the child is still young. However, as the child grows up and is not kept so closely at home, is allowed to play about, visit in other people's homes and later on enter public or private schools, from this time on exposure to infection sooner or later takes place.

The likelihood of infection at this time will depend upon the condition of the child. If a child has been reared in hygienic surroundings at home, has been fed pasteurized or certified milk and has been reared according to the instructions of children's specialists, the condition of the child will then be such as will protect it from ordinary exposure.

Children today receive much better care during early life than ever before, specialists are teaching the mother how to care for and feed her children. Tuberculosis occurring in children whose parents do not have tuberculosis is becoming more rare each year.

Many of the diseases of children, such as measles, whooping cough and scarlet fever, have been regarded too lightly by everyone in all walks of life. Many cases of tuberculosis in children follow one of these diseases, therefore, we should regard them as pre-disposing causes of tuberculosis and such cases should be followed up very closely by the medical attendant.

Tuberculosis in children occurs most frequently in families where tuberculosis already exists and this presents one of the gravest public health problems. In some cities and communities there is an ordinance which provides as follows:

When a child is born in a home where there is a tuberculous individual, either the child or the individual is taken from the home. From a scientific as well as a true humanitarian standpoint this is an ideal procedure, however, it often brings a great deal of grief to the home. Personally, I do not feel that any father or mother could seriously object if they were made to understand that they are sparing their child the danger of infection. It may be of interest to know that this ordinance is rigidly enforced in the city of Chicago.

In communities where this ordinance is not enforced or does not exist, when a child is born in a home where tuberculosis exists, certain rules must be followed. If the father has active tuberculosis he should be rigidly instructed as to the dangers of infecting his child, or better still be sent to a sanatorium. In case the

mother has tuberculosis she should not be permitted to nurse her child or to have the care of the child, preferably she should be sent to an institution. If this cannot be done the physician must explain in great detail the grave danger of the child becoming infected.

Prevention of tuberculosis in children then depends on following out a few general principles

- (1) Keep the child from contact with tuberculous people
- (2) Insist that children be cared for and fed according to the latest instructions laid down in pediatrics
- (3) Always regard any disease of childhood as one that will lower the resistance to tuberculosis and see that the child has made a complete recovery before it is allowed to be up and around
- (4) Advise all children to play in the open and to have sun baths

C M H

The Mop-Up Squad PHYSICIANS WORKING in other lines of medicine and surgery are standing by in a state of perplexity awaiting the final decision of phthisiologists as to whether the treatment of tuberculosis is to remain in the jurisdiction of the internist or whether it is to be placed in the hands of the surgeon.

James Alexander Miller, speaking in the clinic of Chicago's great chest surgeon, the late Carl Hedblom, only a few weeks before Dr Hedblom's untimely death, said that no longer did sufferers from tuberculosis travel long distances to desert or mountains but now seek relief from the surgeon in our centers of population like Chicago and New York.

We have been so zealous for the millennium in tuberculosis that we have gone to dizzy heights of enthusiasm with every great discovery that appeared promising in the treatment of this malady. Koch was sure his tuberculin would prove the cure of tuberculosis. With the several refinements of tuberculin came waves of popularity for tuberculin treatment only

to recede into the calm of unpopularity that must follow faddishness. Far swinging of the pendulum, first to, then fro, followed the advent of Rollier's heliotherapy, sanacrysin, B-C-G vaccination, et cetera.

These splendid and useful contributions have had to fall by the wayside because of the reaction to a fling in the limelight. Doctors as well as patients have fallen victims to enthusiasm and faddishness for the new things in tuberculosis.

Let us analyze more soberly that great contribution—surgery in tuberculosis. Let us give it dignified consideration that it may not suffer the devastating reaction that has come to other great contributions to the fight on tuberculosis.

Rest and rest alone has stood the test of time and is today as always the classical treatment of tuberculosis. In the infiltrative stages of pulmonary tuberculosis and before ulceration is extensive, rest, either relative or profound, is indicated, first, that resolution may be obtained and finally, restoration of function. Disciplined bed rest gives the desired relative rest, artificial pneumothorax, the profound.

Whether through diagnostic failure or inadequate treatment the stage of ulceration, excavation and fibrosis has been attained, a vastly different problem presents. Resolution has taken place through ulceration and destruction. A wreck of cavitation and scar remains, parenchyma is destroyed, restoration of function is obviously impossible. The patient is struggling to overcome the insult of this wreck of proliferation and necrosis.

Surgery offers us the only solution of this problem—mechanics for a mechanical problem. The permanent collapse of this mass of cavitated fibrosis and granulation is imperative. Surgery removes the rigid bony cage, renders toneless the powerful diaphragm and allows collapse of the wreck.

Here we should ponder over the fact that surgery in tuberculosis is unlike other surgery. This insulting infected mass is not amputated, it is only collapsed,

but is otherwise intact. It requires years to attain the maximum result from this indirect attack. We have not removed the infection, we have not restored function. We have prepared the patient for his possible rehabilitation—the end result a cripple, short one lung.

Is not the great tuberculosis problem still early diagnosis?—a diagnosis sufficiently early that the patient may be placed under treatment, either conservative or intensive, to the end that we may expect not only resolution but restoration of function. There is little excuse for either the doctor or patient allowing the case to go beyond the stage where restoration of function may be a reality.

Then if our present knowledge is sufficient to make early diagnosis on all cases of tuberculosis, and if our present knowledge is sufficient to provide adequate treatment for early tuberculosis and restoration of function may be expected, does it not follow that the major role of surgery in tuberculosis is that of the mop-up squad, to clean up the accumulated cavitation cases of the past two generations? Should it not have a comparatively small role following the clean-up?

No more marvelous piece of successful treatment has ever come to the tuberculous sufferers than surgery of the chest, but let us give it the dignity of truth that it so justly deserves, and not exploit it as the future solution of the tuberculosis problem which might finally bring it to a state of ill-repute, an injustice it should never suffer.

O E E

Antiquated Policies **LACK OF** adaptability to the constantly changing conditions involving the tuberculosis problem in the past thirty years has left policies then adopted still in force.

In perhaps no other medical problem have conditions changed more than in the tuberculosis problem. The peculiarities of the tubercle bacilli, their widespread presence at all times, the complicated epidemiology of the disease, the development and revolutionary changes of x-ray diagnosis, the development of the public health

movement, the failure to discover the specific immunizing agent, rapid changes in the practice of medicine, the added surgical procedures in treatment, new health implications in the ever-expanding industrial movement, and now the new problems arising due to the great depression, these things were probably enough to stifle ready adaptability in many instances to the situation as it now presents itself, especially as to the control of the spread of the disease. Many are convinced that bungling politics, lack of statesmanship and ignorance of political science on the part of the members of our profession, as a whole, have done more to retard the public health and with it the anti-tuberculosis movement than anything else. If the public health movement is to include tuberculosis as one of its problems, then in the control of the spread of tuberculosis, the principle of *contagious disease control* should be applied.

In many of our public institutions, the rule is to admit only the very early cases—thus naturally admitting at least a small percentage of non-tuberculous cases and decreasing the number of open cases that should be segregated by admission. If the state is to enter the picture of the tuberculosis problem at all, its only excuse can be for the control of the disease. One of the greatest benefits a state or community can possibly derive from a public-supported institution is the protection such an institution affords in the hospitalization of the open-infectious case of tuberculosis.

Many authorities in public health work claim this benefit far surpasses the individual benefit derived by the patient.

Thirty years ago, before the days of pneumothorax and the later surgical procedures, a large percentage of the open cases remained open. However, today, a great number of the open cases may be rendered closed cases by the later methods and the patient returned to his home no longer a menace to his family or community.

It should be our hope that these antiquated policies will soon be cast aside. If the necessity should arise, we should exert the combined influence of the various health departments and the medical profession at large to bring about the changes and thus compel all public-maintained institutions to deal with tuberculosis as a preventable and communicable disease, by admitting the open cases in preference to the closed cases. C. H. H.

Indications for Collapse Therapy

THERE IS no form of treatment for pulmonary tuberculosis in which such rapid progress has occurred in re-

BY
EDWARD W. SCHOENHEIT
Asheville, N. C.

cent years as collapse therapy. While it came into general use in this country in the form of artificial pneumothorax about 1912, it was only used in the exceptional case for some years. During the writer's experience its use has extended from a small percent of cases with ideal indications to the point where it is at least considered in every patient whose disease has passed through the early stages.

My purpose in this paper is to bring out a few points on the indications for the various forms of pulmonary collapse used in phthisio-therapy, mainly because I believe there is a growing tendency to carry this treatment to the other extreme. This is often the case when a method of treatment meets with success and it would seem wise to strike a happy medium between extreme conservatism and the more radical measures which are beginning to be employed.

Of all forms of collapse therapy, artificial pneumothorax remains the best procedure, if it can be used, as it is the simplest and safest and affords the most satisfactory collapse of the diseased area. It has the additional advantage that it can be abandoned should active disease occur in the contralateral lung. The ideal indications are extensive disease in one lung with little or no disease in the other. The tendency in the past has been to delay compression until the patient was given a chance to improve without it, however, in so doing valuable time has frequently been lost as during the delay adhesions have formed which prevented either the induction of the pneumothorax or sufficient collapse to be effective. While we are aware of the fact that extensive pulmonary disease with cavitation may heal without collapse, the chances are so much better with it, that pneumothorax had better be induced at the start in this type of

case, in fact, when an ulcerative process of any extent has been established pneumothorax had better not be delayed. We no longer hesitate to induce a pneumothorax in the presence of a small infiltrative process in the contralateral lung, and in fact we frequently note that these infiltrations clear up more rapidly after the other lung has been collapsed. Due to the fact that air tends to collapse the diseased area first, we may be able to induce a selective collapse and compress any part of the lung where it is needed. When there is a process in the opposite lung, this is the best plan to follow. Selective bilateral collapse in the presence of bilateral cavitation is a more recent development in pneumothorax therapy and has not met with considerable success in carefully selective cases, but naturally the method is more limited.

Due to the successful treatment of advanced cases, the tendency to induce pneumothorax earlier in the disease has been the natural course of events, however, there is a limit to be reached and it seems that unless cavitation or extensive ulceration is present the patient should be given a chance to improve on a sanatorium regime. The view that in time pulmonary tuberculosis will become a surgical disease seems to me to be erroneous. Pneumothorax or any form of collapse remains an adjunct to the treatment, and in view of the dangers and complications which may ensue I am not in sympathy with the use of pneumothorax in early cases with slight or moderate infiltration often even with a negative sputum. Should this type of case fail to improve by rest and careful management there will be time for pneumothorax therapy.

Phrenicectomy is a method very popular in some sections and seldom used by others. It rarely gives as satisfactory results as pneumothorax but at times the results are brilliant. We now have a case with extensive unilateral, upper lobe, cav-

itation in which pneumothorax could not be induced and thoracoplasty was refused, in which after three months, after a phrenicectomy by Dr Julian A. Moore, the cavities are less than one-third the size and the comparison of x-ray films is almost unbelievable. The patient had been on bed rest previously before coming to Asheville. While the above case is the exception, phrenicectomy should be tried on these cases especially since the operation is relatively easy for the patient. In a case of partial pneumothorax, phrenicectomy may give the added collapse necessary to effect the closure of a cavity. We have seen cases with cavitation in which pneumothorax had been abandoned or where the space had been lost and seen the cavity close after phrenic excision. Phrenicectomy is more effective in apical than basal cavities due to the fact that the latter are usually associated with adhesions which prevent the ascent of the diaphragm. Phrenicectomy should be used with caution in cases complicated with dyspnea and if done at all, only a crushing of the nerve should be employed. Phrenicectomy is usually performed as a preliminary to thoracoplasty.

Extrapleural thoracoplasty is the operation of chance when pneumothorax can not be induced and the process is too extensive or does not show improvement after phrenic excision. Naturally, the

cases are selected with greater care, as it is a serious procedure and cannot be abandoned, however, when other measures have failed and the patient is thought to have a poor chance to recover without collapse therapy, or that the cure will be greatly prolonged, it should not be delayed. It is contraindicated in the presence of active disease in the contralateral lung. Thoracoplasty should not be considered as a last resort measure and should be performed before the patient's general condition becomes unfavorable.

Pneumolysis, or cauterization of adhesions, is often of striking benefit. By severing adhesions a partial pneumothorax may be converted into a complete, or a cavity which is held by adhesions may be freed and successful closure accomplished.

Conclusions

Pulmonary tuberculosis in the early stages should be treated by rest and careful management which is best carried out in a sanatorium.

Pneumothorax should not be tried in early cases until they have been given a chance to improve by conservative methods. In more advanced cases it had better not be delayed.

Thoracoplasty should not be used as a last resort and should be performed earlier in the disease when pneumothorax cannot be induced.

O B I T U A R Y

The death of Franklin D. Martin, Director of the Journal of the American College of Surgeons, has come to our notice. Few men living in the last fifty years have exerted as much influence on the medical profession.

His ability as an organizer has seldom been surpassed in any sphere. He was

one of the best known men of the medical profession.

His presentation book, issued in October, 1934, should be in the library of every doctor of the age. It is an inspiration to the old and the young alike, and should be read by every student who contemplates following his beloved profession.

Environment in the Treatment of Pulmonary Tuberculosis

THERE WAS a time when the treatment of pulmonary tuberculosis was largely, if not solely, a matter of en-

vironment. The activities of the physician were limited for the most part to such symptomatic medication as was indicated for relief of symptoms. If we consider treatment to consist of measures carried out by the physician himself as an attack on the underlying disease, then there was no treatment.

In the course of a generation the situation has become reversed. Today the stress lies on treatment and an enormous amount of good is being accomplished with artificial pneumothorax, phrenic exsiccation, thoracoplasty and, in some selected cases, chemotherapy with gold sodium thiosulphate. In the enthusiasm for the more active attack on the disease the matter of environment is being lost sight of or at best relegated to a very subordinate position.

It is now time for us to ask whether the pendulum has not swung too far and whether environment is not worthy of more consideration than it has been receiving. Our modern hospitals, which in the beginning were scientifically constructed workshops for the effective treatment of acute medical and surgical conditions, now reflect the influence of environment in the effort to combine homelike, or at least hotel-like, rooms and furnishings with the very best facilities for such treatment as may be needed.

If environment is a very real, though intangible, factor in the recovery from illnesses requiring a comparatively brief period of treatment, we may be sure that in a long drawn-out ailment like tuberculosis it is of an importance sufficient to merit the careful consideration of the attending physician. In other words, we must recognize that environment wields

BY
DR. W. A. GEKLER
Albuquerque, N. M.

an influence great enough to profoundly affect treatment, and that the results of the most skilled treat-

ment may be impaired by unfavorable surroundings.

The first consideration is of course the immediate surroundings of the patient. In addition to meeting the requirements of hygiene and cleanliness, they should make available proper ventilation as well as lighting. In this connection it may be well to advise caution in the matter of sunlight. Too much light in the sick room may cause headaches and eye fatigue, and, if allowed to shine directly on the patient, may cause fever. Nor can the esthetic sense of the patient be neglected. An offensive picture, garish hangings or an obtrusive color scheme can become exasperating to the point of madness when one is exposed to them continuously over a period of months.

The business man must be removed sufficiently far from his business that he is spared the annoyances of the petty and harassing details of his work. Before the widespread use of the telephone and automobile a comparatively short distance sufficed, but today he must travel far to escape these pestiferous conveniences and become inaccessible to his business. More often than not the family and ordinary home routine are disturbing factors, either the family is over-solicitous or there may be a very trying lack of harmony. Occasionally, the family adjusts too promptly to a possible fatal termination of the illness and there results a defeatist atmosphere which is hardly conducive to recovery.

A woman who has her home to manage and direct is in even greater need of a complete change of environment than is her husband. The home is her place of

(Continued to page 22)

The Advantages of Intrapleural Pneumolysis

INTRAPLEURAL PNEUMOLYSIS is not of itself a method of treating pulmonary tuberculosis. It is an aid

BY
VICTOR RANDOLPH, M.D.
Phoenix, Arizona

to the establishment of collapse of a diseased lung or collapse of the diseased portion of a lung by effective artificial pneumothorax

There is much evidence to indicate that artificial pneumothorax is the most effective method of treating active progressive unilateral tuberculosis. The tendency is toward using pneumothorax in these cases in earlier and earlier stages of the disease

The aim of treatment with pneumothorax is to collapse diseased lung tissue. Another definite aim should be to avoid collapsing sound lung tissue unnecessarily. These principles of treatment give rise to various types of artificial pneumothorax.

Thus we bring about total collapse of the lung if the major portion of it or all of it is diseased. We wish collapse of the apex or of the upper lobe if the disease is there and do not collapse the lower lobe or lobes in this case if we can collapse the upper lobe without doing so. This is the so-called selective type of pneumothorax. At times a selective collapse of the lower lobe also may be obtained, for the affected lung tissue collapses much more readily than the undiseased lung.

The type of configuration of the pneumothorax may become quite bizarre if there are adhesions between the visceral pleura covering the lung and the parietal pleura. When this occurs large amounts of air and high pressures have often been used in attempting to stretch the adhesions. This frequently brings about complete collapse of the whole lung except the portion held by adhesions, this usually being the diseased area. This area collapses as fully as the stretching of adhesions will permit.

The ideal pneumothorax to my mind is

the selective type. This type is often available only if treatment is begun early when only a portion of the

lung is involved, before extensive destruction can occur, and before adhesions have time to form. This type not only assures collapse of diseased lung tissue, but allows undiseased lung and pleura to maintain its resiliency so that the lung can later enlarge and fill the chest and restore some lung function after the diseased portion has healed and become scar tissue.

Selective collapse is absolutely essential in those desperate cases of bilateral progressing tuberculosis where it has now become possible and not uncommon to use pneumothorax simultaneously in both chests. In these cases the undiseased lung must continue to function as fully as possible while the diseased portions are kept collapsed.

When pleural adhesions are present in the diseased portions of the lung in these cases, selective pneumothorax frequently cannot be established without cutting the adhesions.

The figures of Matson show, in unilateral pneumothorax, that about 60% of all patients treated have adhesions. One-third of these have adhesions throughout the chest. In two-thirds of these, or 40% of all cases, a partial pneumothorax is established. Many of these are successfully treated by pneumothorax, but a large number must have their adhesions cut if treatment is to succeed in curing them. According to a recent writer (Forsee), one-third of all cases get only a partial collapse. He estimates that about one-third of these require cutting of adhesions. With perfection in the technique of operation I believe we will find a larger percentage benefitted by it. Stiver, who told me recently that he had operated about one hundred and thirty cases with adhesions, estimated that 15% of pneu-

mothorax cases are suitable for this treatment

The advantages of intrapleural pneumolysis, or cutting of pleural adhesions, are the advantages of effective artificial pneumothorax. The disadvantages or the complications of this operation are in no way comparable to the disadvantages to the patient of continuing ineffective pneumothorax, the end results of which have been found to be poor.

A successful intrapleural pneumolysis is thus a life-saver to the patient in that it brings about an effective collapse of his diseased lung and gives an opportunity for eventual cure. As already mentioned, the preservation of the sound portion of the partially collapsed lung and pleura affords an opportunity for eventual re-expansion of the undiseased lung and the return of pulmonary function, sometimes to an almost normal degree.

The establishment of selective pneumothorax is particularly important in a case in which there is some definite but slight active involvement of the contralateral lung. In this type of case selective pneumothorax of the more involved side preserves the possible maximum of vital capacity and thereby gives the less-involved lung a better opportunity to heal, whereas if ineffectual pneumothorax only is obtained, the probability of progression of the disease in the lesser-involved lung is heightened.

Pneumolysis is occasionally of great immediate value in cases of hemorrhage coming from a partially collapsed cavity held open by adhesions which can be cut.

It has a marked economic advantage not only in restoring health but in decreasing the duration of the disability by shortening the period of ineffective treatment. This decrease in time of treatment is also of some social importance, especially in the case of young people, for it saves a prolonged period of invalidism.

Even when all adhesions cannot be liberated, the cutting of some of them at times will allow a sufficient collapse of the diseased portion of the lung so that eventual healing may occur. A partial

intrapleural pneumolysis is therefore often of value.

In the case of bilateral disease requiring simultaneous bilateral pneumothorax, the presence of adhesions may spell complete failure of the treatment unless the lung is liberated. In these cases it is usually only by intrapleural pneumolysis that selective bilateral pneumothorax can be established. At the present time Dr Fred Holmes, Dr Howell Randolph, Dr George Thorngate and myself have under treatment some fourteen cases of clinically successful simultaneous bilateral pneumothorax, which have been made possible only by intrapleural pneumolysis on one or both sides. Not all adhesions have been liberated in all these cases as in at least three of these only a partial pneumolysis was possible, yet a sufficient freeing of the lung was accomplished so that the diseased area could be collapsed without using enough pressure to affect the sound lower portions of the lung.

This method is almost of equal value in those cases in which pneumothorax must be used first on one side of the chest and successively on the other side.

Finally, intrapleural pneumolysis has a field of importance in those cases of bilateral disease where pneumothorax is prohibited entirely on one side by diffuse adhesions, but may be established on the other side successfully by the aid of cutting adhesions. In these cases if an adequate selective collapse can be obtained on one side, we find that effective treatment on this one side can often be carried out until the lung is healed sufficiently to allow surgical compression of the other side which has not yielded to attempted pneumothorax. These cases are of course all desperate ones, but the treatment is not necessarily as desperate as would seem. If selective pneumothorax is established, the patient is given a fairly good portion of sound lung with which to breathe in addition to whatever breathing space remains in the uncollapsed diseased lung, and this is sufficient to carry on life. If the disease in the uncollapsed lung progresses rapidly the situation is of

course hopeless, for one to two years must elapse before the selective pneumothorax can successfully heal the other lung

However, these patients seem to do remarkably well, and cures of this type will eventually be reported

Case 1

S G Referred by Dr Fred G Holmes A woman, 25 years old Teacher On May 14, 1932, physical and x-ray examination showed a cavity near the left apex and some active infiltration in the right apex. (Fig 1) Artificial pneumothorax on the left was attempted within a short time after the first examination Adhesions were found, (Fig 2), which prevented collapse of the cavity and at operations in December, 1932, and in August, 1933, these were cut under local anesthetic There was meantime no definite progression of disease in the opposite lung, although in this case about four months elapsed before the cavity closed after all adhesions were liberated (Fig 3) A greater collapse of the lung was necessary in this case to bring about closure than is ordinarily the case, (Fig 4), but at the present



Fig 1—Case 1



Fig 2—Case 1



Fig 3 Case 1
Six months later mediastinal adhesions still present



Fig 4 Case 1 Seven months later
The cavity remained open 4 months after all adhesions were liberated

Fig 5—Case 2



time she has a selective type of pneumothorax, and the lesions in the right lung have undergone some definite healing

Case 2

M S A similar type of case also referred by Dr Fred G Holmes is next shown, but in this case the original film showing the large cavity in the apex of the left lung and the succeeding film showing the adhesions present have been lost Five short thick adhesions were liberated in this case on March 9, 1933, over a year after the establishment of pneumothorax, and she has at the present time a selective type of pneumothorax without evidence of cavity (Fig 5) The disease which was originally present on the right side has so far remained quiescent

Case 3

B S Here rather marked bilateral disease with some cavitation was present, (Fig 6), when patient was first seen. Treatment would probably have been continued rest in bed and dietary regulations for a time except for the fact that he began to have severe hemorrhages from the right lung. Artificial pneumothorax was therefore begun on the right side but the hemorrhages were not controlled until a lateral adhesion, (Fig 7), which prevented collapse of the cavities in the lung, was

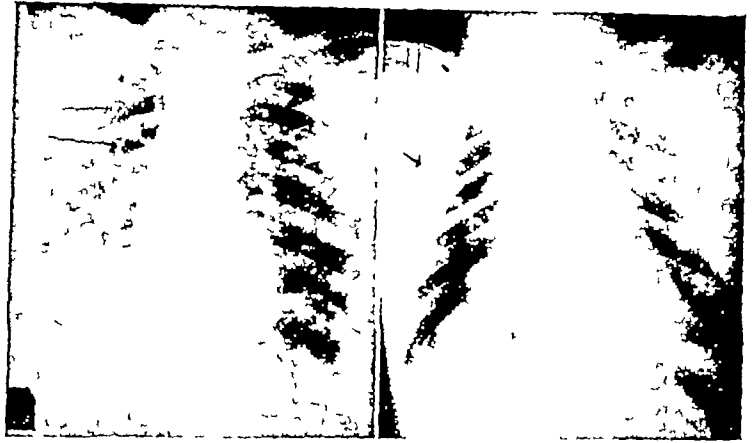


Fig 6 Case 3

Fig 7 Case 3
Hemorrhage was controlled after the adhesion was liberated

liberated. The hemorrhages controlled, the patient made excellent progress for several months until he went to another state.

Case 4

R Z In this patient, the economic factor was important. This woman, age 34, worked as secretary (although she had tuberculosis) for five years in this climate before having acute exacerbation, at which time, March 7, 1933, she consulted me. Examination showed a very marked involvement of the left lung with adhesions. There was a large cavity below the left clavicle (Fig 8). Artificial pneumothorax on the left was begun March 20, 1933, and the symptoms markedly relieved (Fig 9). However, the sputum remained positive and the cavity was

not fully collapsed owing to multiple adhesions. These were cut in successive operations on July 3, 1933, and July 28th, 1933. The symptoms were entirely relieved following these operations, the patient's general condition improved markedly and she was able to return to work a month after the second operation. She has remained well and at work, and the more than slight infiltration which was present originally in the right lung has remained quiescent. In this case more than a selective collapse has been maintained because of the original extensive involvement (Fig 10).

Fig 8 Case 4

Fig 9 Case 4

Fig 10 Case 4



Case 5



Fig 11 Case 5



Fig 12. Case 5



Fig 13 Case 5

G S The following case, referred by Dr Fred G Holmes, illustrates what may be accomplished at times by only a small partial pneumolysis. In this case there was extensive bilateral disease of the upper lobes (Fig 11). Artificial pneumothorax on the right side was attempted. However, diffuse adhesions prevented any collapse. Artificial pneumothorax was then begun on the left side but only a partial collapse was obtained (Fig 12). Thoracoscopy was done on September 11th, 1933, about two months fol-

lowing the film shown. A few very small adhesions at the base were cut, the examination showing that the lung was plastered against the chest wall by very diffuse sheets of adhesions which offered no opportunity for cutting. Nevertheless a considerable improvement in collapse following this small partial operation was shown, and the cavities on the left side are now apparently closed (Fig 13). In the next few months pneumothorax on the left side can be discontinued and a partial thoracoplasty of the right chest done

*Case 6

L P A school teacher, age 26, was first seen August 11, 1930, but did not return again until November 27, 1931, at which time she showed little effect of over a year of bed rest on her extensive bilateral tuberculosis (Fig 14). Artificial pneumothorax of the right side was begun in January, 1932, but adhesions prevented collapse of the cavities in this lung (Fig 15). About a dozen adhesions were cut on May 9, 1932, permitting selective collapse (Fig 16). However, the left lung did not improve sufficiently, so that artificial pneumothorax was begun on the left side October 24, 1932 (Fig 17).



Fig 14. Case 6

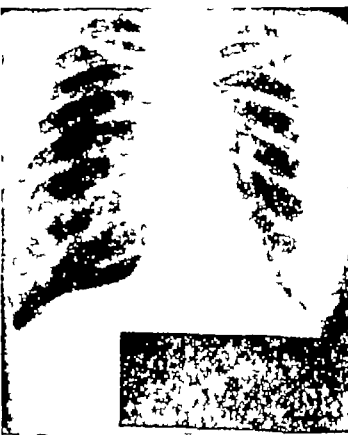


Fig 15 Case 6

Here again adhesions prevented collapse of a cavity at the apex and these were cut on February 6, 1933, permitting a selective collapse of the left side also. This bilateral selective collapse has been continued until the present time (Fig 18). This young lady is now attending college.

*This case was reported but not illustrated in a previous article: Surgical Treatment of Pulmonary Cavities in Tuberculosis. Southwest Med 18: 201 (June) 1934.



Fig 16—Case 6

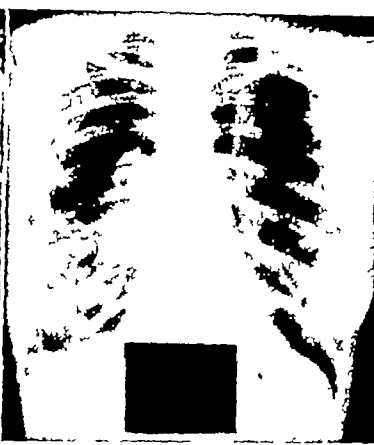


Fig 17—Case 6



Fig 18—Case 6

Case 7

W P Referred by Dr Fred G Holmes
A woman 26 years of age, first seen by Dr Holmes January 20, 1933 Because of extensive bilateral tuberculosis with cavitation, (Fig 19), artificial pneumothorax on the more involved right side was first attempted The lung on this side was found to be entirely adherent not permitting any collapse Artificial pneumothorax was therefore begun on the left side on July 8, 1933 Film of August, 1933, (Fig 20), shows partial collapse of the left lung with cavitation still present, the lung being kept from collapsing by pleural adhesions at the apex Intrapleural pneumolysis on the left side was therefore performed on September 8, 1933, and selective type of pneumothorax was obtained which has been continued to the present date

(Fig 21) The patient's general condition has more than remained stationary despite the extensive involvement on the right side and the presence there of several cavities She is constantly in bed but is not too short of breath to come to the office occasionally for fluoroscopic examination She has gained considerable weight and has little fever In this case it is expected to maintain pneumothorax on the left side for an additional period of several months in order that sufficient healing of the left lung may occur to permit its re-expansion At that time thoracoplasty of the right chest may be done safely and the patient restored to some degree of health It is even possible that she may be comparatively well once the left side is healed and the right lung is thoroughly collapsed



Fig 19—Case 7



Fig 20—Case 7



Fig 21—Case 7

The Patient and the Sanatorium

NUMEROUS ARTICLES have been written on the early diagnosis and treatment of pulmonary

tuberculosis, and today the chest men, as well as the general practitioner, are agreed on the fundamental principles in treatment. Rest of the diseased lung is the basis of treatment, and it can be obtained either medically or surgically, at times both measures are used.

When the diagnosis of pulmonary tuberculosis is made, the usual questions asked are as follows:

1 Do I have pulmonary tuberculosis, and, if so, how much of my lung is diseased?

2 Can I get well, and how long will it take?

3 Where is the best place to be treated, and what results will be accomplished?

The first question can be decided by the clinical history, physical examination, and X-ray, and in some cases, time. The answer to the second question is determined by the extent of the involvement, also by that intangible thing called "resistance of the patient," and by the absence of severe extrapulmonary complications. The third question may be answered by the positive statement that the sanatorium is the best place to obtain an arrestment of the disease. The sanatorium affords the training that teaches the patient to re-adjust his habits and to learn to direct his mental and emotional attitudes in the least time with the best results.

When the diagnosis of pulmonary tuberculosis is made, the patient should be urged to enter a sanatorium—state, federal, city or county, or fraternal or private. Rest, the cardinal point in treatment, can best be followed in an institution where the hours of rest are rigidly enforced and where everyone has to conform to the same rules. Since complete bed rest for the acutely active with pronounced clinical symptoms is insisted upon, the home

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is not the best place to obtain rest. In the home the patient sees visitors at all times during the

day, he attempts to transact his business or manage household affairs from a sick bed, he is disturbed by the social activities of other members of the family, who create confusion both on leaving the house and on returning at late hours, noise of all kinds—traffic, radios, neighbor children at play—keeps the patient upset, either on account of the lack of knowledge concerning the disease or because of some layman's preconceived ideas as to treatment, members of the family fail to co-operate in keeping the terms of the rest schedule.

Physicians doing private practice usually have a struggle with the patient, the family, and the well-meaning friends. Friends and visitors mean well, but they occupy a very small place in the treatment of pulmonary tuberculosis when they do not interfere, but are a grave problem when not controlled. It is a common occurrence for the physician to make a subsequent visit to the home only to find that the hours of rest have been changed, meals are being served irregularly, and even food which has been prohibited has been brought in by some neighbor who would never feel herself responsible for the patient's intestinal upset. Perhaps the patient has been taken for an automobile ride, is occupying the room with some other member of the family, or is being worried by literature, written by some one not informed on the subject, suggesting this and that method of treatment.

In truth, treatment in the home has so many disadvantages that the removal of a sick person from the family is the greatest favor a doctor can do for him. In my own experience I have seen on more than one occasion a sick person killed by kindness. An outstanding case is that of an anxious and exercised mother, with a young daughter, who will not let the child

be alone, she continually asks the patient how she feels, whether she would like this or that to eat, and about her symptoms. The ultimate result is that the mother takes the patient here and there, finally running into an open grave.

All informed people know that there is no specific medication for tuberculosis and that all measures adopted are indirect, tending to rest the diseased part and to build up the patient's resistance. With this generally known, the laity and some physicians assume that the physician does not have a prominent part in the treatment. It is true that many patients can be educated in the treatment of tuberculosis and will learn much, but getting them to apply their knowledge so they will stay in line is another problem. The physician has a most prominent part, for he is the crutch to lean upon. His daily routine visit is necessary because many questions come up in the minds of the sick persons, and some one who knows has to give the answers. If not, some one else will do so with the result that wrong advice will be given and bad results will follow. The physician stands for authority and discipline, and the latter has to be rigidly enforced. That the patient looks to the doctor for cheer and encouragement, as well as relief from distressing symptoms, is a fact that should be kept constantly in mind by anyone treating the disease.

Another point to bear in mind is the constant danger of infection to the family. Children are usually infected when the diagnosis is made, especially in the poorer homes, but regardless of how well we instruct the patient in transmission of the

disease, the use of sputum cups, the necessity of separate sleeping quarters, and proper care of dishes, these precautions are hard to take and the patient has to be eternally vigilant.

Rules have to be followed if satisfactory results are obtained, and they can best be followed in a sanatorium properly conducted. Pulmonary tuberculosis is a disease measured in years, not in days or weeks, and this prolonged illness is much easier on the patient and the physician in a sanatorium. There is a spirit of comradeship and "teamwork" between patients and the physician, and the spirit of optimism and get-well attitude prevails in a sanatorium.

In recent years, the position that surgery occupies in the treatment of this disease has been brought to the front. It has taken time for this information and teaching to reach the medical profession, and will take longer to educate the public. To obtain permission from a patient to do some type of surgery, such as artificial pneumothorax or phrenic nerve avulsion, two of the simplest and most applicable procedures, is not difficult if the patient is in a sanatorium, because he sees others who are taking, or who have taken, this type of treatment and who have been benefitted. These two forms of treatment are more easily instituted in a sanatorium where they are applied daily and where the necessary equipment is to be had at any time.

The sanatorium for the treatment of pulmonary tuberculosis occupies the same position as the general hospital for the surgical and medical treatment of different diseases.

G. W. BRAY, M. D. Tuberculosis and Allergic Diseases. *British Journal of Tuberculosis* Jan 1934

Bray draws the following conclusions:

- a. Only one person with active tuberculosis in 200 suffers from true asthma.
- b. Only one asthmatic person in 100 gives any positive evidence of active tuberculosis.

The author concludes that if a tuberculous subject does develop asthma it can usually be relieved by a course of specific desensitizing injections, because the patient is generally subject to some specific agent of an inhalant nature. He also concludes that, in rare cases, the sensitizing agent may be bacterial in origin, usually, the bacteria is of a secondary invasion.

Primary Cancer of the Lung and Its Relation to Pulmonary Tuberculosis

PULMONARY TUBERCULOSIS

in its many manifestations may so resemble primary cancer of the lung that

only repeated careful examinations can settle the question. It seems to be generally accepted that primary cancer of the lung is much more frequently seen since the World War and a great increase of interest has been shown in the subject. Interest in pulmonary tuberculosis was never greater than at the present time and it is only natural that medical men the world over should attempt to discover what relation, if any, exists between the two diseases.

Tissue reactions due to irritants are generally accepted as one of the commonest causes of cancer and reference is frequently made to the large number of primary cancer of the lung found among the Schneeberg cobalt miners due to the irritant action of radio-active dust. Mention is also made of the fact that primary cancer of the lung is five times more prevalent in males than in females due to a preponderance of male workers in the dusty trades. These facts are interesting, but they do not wholly cover the situation, and we await the day when new light can be thrown on the whole subject of malignant disease.

If we accept "irritation" as a cause of cancer of the lung may we not number among the irritants chronic inflammation? In the reference outline of the committee on chest tumors of The California State Medical Association the statement is made that carcinoma of the lung frequently follows pulmonary tuberculosis and in Hruby-Sweany's excellent article entitled "Carcinoma of the Lung" in the October 1933 number of *The Archives of Internal Medicine*, Ewing is quoted as saying that tuberculosis is a possible causative factor.

Many other diseases which affect the respiratory tract are mentioned such as influenza, bronchiectasis, asthma, syphilis,

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pneumonia, etc., but pulmonary tuberculosis seems to be the one most frequently considered. I should

like to present a few facts gleaned from a study of twenty-eight cases of primary cancer of the lung taken from the files of the Los Angeles General Hospital and four private cases to determine whether any of them bore any relation to tuberculosis. Of the thirty-two cases mentioned above twenty-six were males and six were females. The sex incidence in this series follows very closely the cases reported in recent literature. Thirty of the patients were white and two colored. The average age was fifty-one, the oldest being seventy-six, the youngest twenty-three. Sixteen of the cases came to autopsy and the diagnosis of primary cancer of the lung was confirmed. The remaining sixteen cases are either in the hospital, have returned to their homes or have died and autopsy has been refused. All were carefully reviewed by the malignancy board and the diagnosis verified. One case had a two-stage thoracoplasty done under the impression that pulmonary tuberculosis was present, but no tuberculosis was found at autopsy. One coroner's case was said to have a scarring in the region of the tumor mass that might have been tuberculosis. This is the only one of the cases in which tuberculosis entered the picture, and there is nothing in any of the histories or in the course of the disease to lead one to conclude that tuberculosis antedated the disease in any of the cases.

Physical examination of the chest shows considerable resemblance between the two diseases, but radiographically there is usually a marked difference. Infiltration in an early case of pulmonary tuberculosis is usually in one upper lobe and has the usual sleazy appearance, whereas in primary cancer of the lung there is mass involvement, large or small, and usually in

(Continued to page 22)

X-Ray in the Diagnosis of Pulmonary Tuberculosis

SINCE THE introduction of the stethoscope no accessory aid has come to us which has proved its value in the diagnosis of pulmonary tuberculosis as has the Roentgen ray

BY
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whether or not it empties well

Stereo-roentgenograms, or films, are now being made with such skill and precision that it is possible to obtain a very clear view of the lung in its most minute anatomic detail, and to observe with ease any abnormalities which may be present

Fluoroscopy, while furnishing information of a different nature to that furnished by the film, likewise has its field of usefulness, and its importance must be duly recognized

Some of the instances wherein properly made and skilfully interpreted stereo films are particularly helpful are

1 In the diagnosis of the childhood type of tuberculosis involving the tracheo-bronchial lymph nodes, where physical signs and even general symptoms are either entirely absent or very few

2 In those cases, in adults, in which the usual clinical procedures have failed to definitely establish the presence or absence of disease, and a strong suspicion still remains that there may be trouble Here the X-ray will often disclose a focus of disease inaccessible to physical exploration, or one that is masked by other conditions

3 In the differential diagnosis between tuberculosis and new growths in the lungs or bronchi, and lung abscess or bronchiectasis In the study of new growths, particularly, it is quite important that lateral pictures be made, as well as antero-posterior ones

4 In the study of cavities, which from physical signs are known to exist Good stereo films make it possible to study more accurately the exact size and depth of the cavity, the thickness of its walls, its relation to adjacent tissues, and

5 A tangible picture of conditions as they exist is at hand to be shown and explained with proper diplomacy to the patient himself or anxious members of his family

6 A permanent record is supplied and may be filed for comparison with subsequent films in a series, and the progress either way accurately determined

7 Recently the X-ray has been used successfully in the diagnosis of laryngeal tuberculosis by Pancoast in America and some roentgenologists in Germany and other foreign countries

The use of the fluoroscopic screen makes possible a study of the movements of the diaphragm, the condition of the costophrenic angles, and the variations of pulmonary shadows in respiration and cough It is also of great value in determining the presence of small collections of fluid, encysted or otherwise, and makes it possible to study the lungs and pleura from different angles by turning the patient about during the examination This method does not give accurate information as to details of structure or extent of lesions, nor does it furnish any permanent record, so that it cannot take the place of X-ray films, and in general it should be considered but an adjunct to them

While recognizing thus the great diagnostic value of the Roentgen ray, we should be reminded that it is only an accessory aid and cannot take the place of the clinical history, symptoms, the microscope and physical findings in arriving at a diagnosis In other words, the clinician who undertakes to make his diagnosis purely as a result of a study of X-ray films, no matter how clear they may be or how good he may be at interpreting them, is destined to meet with disaster sooner or later

It must be remembered that like any

diagnostic method its value will be measured by the technical skill of the physician in the making of the films no less than his ability to interpret them. The film must be clear and its markings well defined in order that the normal shadows may be distinguished from the pathological. The interpretation of hazy, or otherwise imperfect films, has as little justification as a physical examination of the lungs without disrobing the patient.

Skill in the interpretation presupposes not only a familiarity with Roentgen shadows, but also a working knowledge of the clinical and pathological features of tuberculosis. Unless such knowledge is at the disposal of the examiner, he will not be in a position to profit fully from his study of the film, nor will he be able to express in appropriate language the

clinical or pathological type of the disease. It is hardly necessary to point out that only a physician is possessed of the knowledge which is a necessary prerequisite of such an intelligent interpretation. It is an affront to the clinician to offer him, as is sometimes done, the opinion of a non-medical technician in a case of tuberculosis. The Roentgen diagnosis will inspire respect in the mind of the clinician commensurate with the medical knowledge of the Roentgenologist.

In conclusion, the X-ray examination of the chest is almost indispensable to the diagnosis and understanding of pulmonary tuberculosis, when employed in conjunction with other methods at one's disposal, and when this fact is recognized more generally, much higher standards of efficiency in the field of medicine will be attained.

ROSE, F. Purulent Tuberculous Pleurises (Russian) Nov Chir Arch 28 387

Tuberculous empyema develops most frequently during pneumothorax. It developed following spontaneous pneumothorax 13 times, 2 in thoracoplasty and only 4 developed in cases in which no pneumothorax had been performed. In all, tubercle bacilli were found in the fluid. In the treatment of these cases two methods are to be considered: conservative and surgical. The first consists in evacuating the fluid and washing the pleural cavity, by means of two puncture needles with from 5 to 10 liters of normal sodium chloride solution until the fluid runs clear. This procedure lasts from one to one and a half hours and was repeated in from five- to seven-day intervals, 15 or 16 times in all. When the pleural fluid remained purulent after that time and no cure or marked improvement was obtained, the case was considered unfit for conservative treatment. Twenty-four cases were treated by this procedure: 19 were pure tuberculous empyemas, of which 7 were cured, 7 were improved, and 5 were unchanged. Five were tuberculous empyema with mixed infection, all of which were fatal.

Surgical treatment consisted of paravertebral thoracoplasty, and with even better results in the complete costal resection of Rose. The latter is performed in three stages, with two or three weeks between stages. In cases with severe toxic symptoms the pleural cavity was drained at the first stage.

The results obtained by paravertebral thoracoplasty of Sauerbruch-Brunner type were not favorable. With Rose's operation without previous drainage on three cases, one patient was cured, one died with amyloid degeneration, and one was drained later. Better results were obtained by Rose's operation with drainage: of nine cases six patients were cured, in two suppurating sinuses persisted, one died.

Tuberculous empyemas with infection cannot be saved by conservative treatment. Rose's operation with primary drainage gives the best results: of 33 patients operated on by the procedure 11 were cured, 12 decidedly improved, 3 moderately improved, 7 died. Two were operated by the Schede's procedure: one was cured, one died. Of all these cases one-third were cured, one-third were able to work although with suppurating sinuses, one-third died.

ENVIRONMENT

business and it is simply impossible for her to remain in it and not be concerned with its management. Where a few decades ago the job of housekeeping, if well done, completely occupied a woman's time, modern inventions have relieved her of routine drudgery to the point where she has considerable leisure for a broader social life. She needs protection, when sick, from her friends and social contacts and this is most difficult, if not impossible, unless she is so acutely ill that only members of the immediate family are permitted to see her. If not disturbed by the solicitude of her friends she is apt to be hurt by their remaining away from that fear of contagion which is the result of our intensive health education. And if there are children in a household it is essential that any member who has open tuberculosis and is a disseminator of tubercle bacilli be removed from it. The aseptic

(Continued from page 10)

technique, which is necessary for the protection of children against infection, may be faithfully carried out for a short period, but over a longer time it becomes burdensome and usually is slowly abandoned.

In conclusion, let me emphasize that the family physician who is faced with the responsibility of advising the tuberculous patient in the matter of treatment will do well to keep in mind the basic fact that whatever line of therapy may be indicated in any given case, environment will exert a potent influence in determining its success or failure. In addition to securing for his patient that form of treatment which promises the best end results in human happiness and social and economic usefulness, serious thought should be given to the matter of selecting the particular environment best suited to his physical and other needs.

PRIMARY CANCER

the region of the hilum. From this radiate root-like lines of density into the adjacent parenchyma.

Examination of body secretions and excretions and blood is not remarkable. In some cases cancer cells may be found in the sputum or in the pleural exudate in cancer of the lung, whereas tubercle bacilli are usually found in the sputum and in the exudates in pulmonary tuberculosis.

Thus far the writer has tried to describe the general attitude of the medical profession toward the relation of pulmonary tuberculosis to primary cancer of the lung. He has also tried to show that from his case reports no strong evidence could be adduced to show an etiologic relationship.

As I have mentioned elsewhere, the symptomatology is similar and this also applies to the physical signs, but there are a few outstanding events in the course of primary cancer of the lung that are absent in pulmonary tuberculosis.

a The first symptoms of primary can-

(Continued from page 10)

cer of the lung may be those of a pneumonia that fails to resolve.

b Massive collapse and lung abscess due to obstruction of a bronchus is not uncommon.

c Pain is a very common symptom and is difficult to control.

One can hardly discuss tissue changes and variations and a variety of other subjects and still be within the confines of the title, but the prognosis in primary cancer of the lung even in these days of rapid and intensive improvement in the technique of lung surgery can hardly be said to be good, whereas the early case of pulmonary tuberculosis is usually curable. Therefore, from the point of view of treatment the relation between the two diseases hardly touches at a single point.

Let us say, then, that primary cancer of the lung and pulmonary tuberculosis, judging from the cases described and the observations made, bear very little relation to each other except in symptoms and physical signs.

The Contagiousness of Tuberculosis

IT IS TRUE that tuberculosis is both infectious and con-

tagious, but it is not contagious by contact as are measles and other acute infectious diseases. In other words, tuberculosis is not likely to be conveyed by such contact as riding in the same street car, walking on the same side of the

street, or even sitting in the same room with a tuberculous individual. More intimate contact than this is required.

The morbid fear which is harbored by many individuals is not justified and the knowledge that it exists among his friends adds to the unhappiness of the patient. The physician can do much in a tactful way to dispel such ideas. R B H



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When writing please mention DISEASES OF THE CHEST

ABSTRACTS



This department is devoted to abstracts of articles carefully and judiciously selected by the Editorial Staff

The Nutritional Value of Pasteurized Milk. Brit ish Med Jour 3830 995-996 Ext Editorial, International Med Digest June 2d, 1934

From time to time the relative merits of pasteurized milk as compared to raw milk have been made the subject of discussion, and at the present time the opinion seems to be growing among members of the medical profession that milk cannot be recommended for human consumption in the raw state. Those who have advocated raw milk have contended that the nutritional value of milk is greatly impaired when it is subjected to pasteurization. It is interesting, therefore, to read the results of a comparative study which was made in England.

The investigation was carried out in 1930 in Lanarkshire, as follows. For four months in certain schools five thousand children of five to twelve years of age were given three-quarters of a pint of raw milk grade A (T T) milk a day, and five thousand children in the same schools were selected to act as a control series. In a second set of schools five thousand children were given three-quarters of a pint of the same milk pasteurized, and another five thousand children in the same schools were selected to act as controls. The children were measured and weighed at the beginning and at the end of the experiment. It was found that the children receiving extra milk grew more rapidly than the controls, and that the effects of raw and pasteurized milk were, so far as it was able to judge, equal.

After a special study of these figures by a committee from University College, London, they reported "There is no evidence that raw milk has an advantage over pasteurized or pasteurized over raw in increasing growth when the two are directly compared. Thus the question of the value of pasteurization turns practi-

cally on the elimination of possible sources of disease, or on determining whether cases of certain diseases are less frequent when pasteurized rather than raw milk is taken."

These results of the investigation are compared with the investigation which was reported in the United States in 1932. It consisted of an extensive field of study of the height and weight, at the ages of ten months to six years, of two groups of children, one of which had consumed raw milk and the other heated milk. All together, over three thousand children were studied, and the conclusions were that there was no evidence to suggest that the growth-promoting capacity of heated milk was measurably less than that of raw milk. It is, however, of particular interest to notice that children receiving mainly raw milk had suffered from diphtheria, scarlet-fever, intestinal disturbances and rickets more than children who had received heated milk only.

HEACOCK, H. E. Classification of Intestinal Tuberculosis. Amer Journal of Roentgenology and Radiotherapy 32 717-854 Dec 1934

The author does not agree that calcium deposits in the intestinal tract are to be considered diagnostic of intestinal tuberculosis in more than 52% of the cases. In such cases it may be of value in the estimation of the extent of healing. The author points out that calcification is not the rule in any condition other than tuberculous foci. He believes that calcification occurs in primary lesions of intestinal tuberculosis. He carried out routine examinations of the gastro-intestinal tract in five cases with special reference to intestinal tuberculosis and in all cases the Roentgen signs of the disease were present. He differentiates between calcified



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areas and glands and those shadows produced by injections of bismuth and mercury compounds. He concludes that clinical history will prevent such suspicious shadows from being confused with those due to tuberculosis.

McINTOSH, H. C. Changes in the Lungs and Pleura Following Roentgen Treatment of Cancer of the Breast by the Prolonged Fractional Method. *Radiology*, 1934 23 558

McIntosh reports four cases showing different degrees of pleuropulmonitis. He suggests that there is a possible influence of age and arteriosclerosis on the abnormal pleural and pulmonary changes. He suggests that morbidity and possible mortality in cases of cancer of the breast, as well as intrathoracic malignancies, may be due to pleuropulmonitis following Roentgen treatment.

The author points out the difficulty of differentiating between irradiation changes and advancing metastases, especially in cases in which more treatment for palliation of the metastases is contemplated. He points out in all cases reported hereafter the possible influence of age and possibly arteriosclerosis are to be considered.

WALLGREN, A. The Value of Calmette Vaccination in the Prevention of Tuberculosis in Childhood. *J. Am. M. Assn.*, 1934 103 1341

With regard to the safety of such vaccination, the author quotes that a study of all available material found up to the present time, not one of the million children who have been vaccinated has suffered any evident harm from a carefully prepared and carefully employed vaccine. The author himself has vaccinated 230 children, of these only two have died. One had epidemic meningitis and the other acute pneumonia. Autopsy in each case showed no evidence of tuberculosis. He concludes that the curve of the mortality rate constitutes definite proof that the principles he has followed have been efficacious in the purely practical application of antituberculosis vaccine as a prophylactic measure against tuberculosis in the children of a community.

Wallgren cites that in three five-year periods immediately preceding 1927, when he began his study, the number of deaths from tuberculosis per 1,000 children was 43, 42 and 34 respectively, while in 1933 the first year of the next five-year period it was only 03.

BETHEA, OSCAR W. The Treatment of Pulmonary Abscess. *Internal Medical Digest* Vol 26, No 2, Page 114, Feb 1935

Betha divides the treatment of pulmonary abscess as follows:

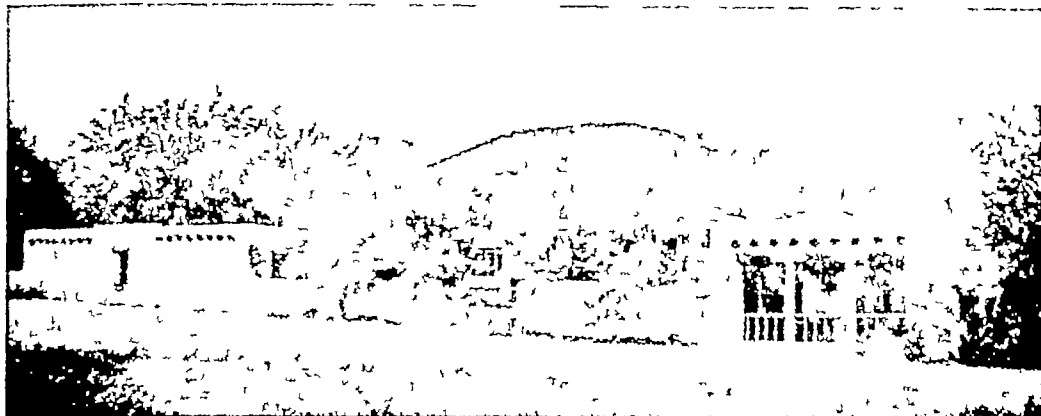
- (1) Prophylaxis
- (2) Expectant treatment including general care, medication, postural drainage and bronchoscopic examinations
- (3) Surgery including many and various procedures

In discussing *prophylaxis* the author stresses pre-operative treatment to the mouth and tonsils. This is very important because a study of 415 cases of post-operative pulmonary abscesses showed that over 61% of this group followed tonsillectomy, 25% developed from pneumonia and 10% from aspiration of a foreign body.

He further discusses the fact that the Vincent group of organisms are present in the mouth in a fairly large percentage of cases prior to operation. Obviously the Vincent group, as well as any other organism, when found present, should be taken care of prior to operation.

Under *expectant* treatment he believes that "operation should be reserved for such cases as are definitely becoming worse, failure to improve in early stages is not necessarily an indication for surgical drainage. If the condition should be stationary after efficient treatment, for a period of at least two months, then further measures should be considered." Rest, both mental and physical, fresh air, sunshine, body comfort and hygiene are just as important as they would be in active pulmonary tuberculosis.

Postural drainage is one of the most valuable measures and should be instituted as soon as the patient begins to cough up large amounts of characteristic mate-



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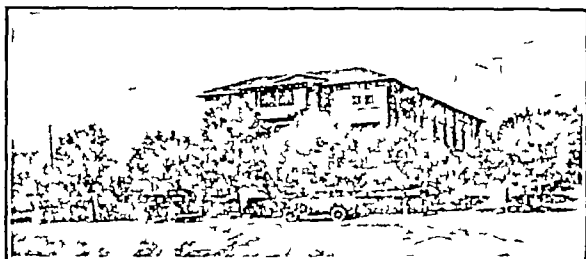
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rial He points out six different positions to be used in which the patient remains about five minutes

- (1) Lying on the back
- (2) On the right side
- (3) On the abdomen
- (4) On the left side
- (5) Sitting up
- (6) Knee-chest position

The sixth position can be substituted by the patient by elevating the foot of the bed. A study of the drainage following these positions will soon indicate the position of choice for postural drainage.

On account of Vincent's being one of the predominating organisms present in lung abscesses, routine treatment of 0.3 gm. arsaphenamine should be given every four or five days, and at the same time an intra-muscular injection of sodium bismuth thioglycollate.

Bronchoscopy is growing in more favor by clinicians and it is urged that a patient be given the benefit of six or seven such treatments before surgery is considered.

Many physicians feel that when such treatment is carried out sufficiently early, surgery is seldom necessary.

Surgery is necessary in a certain percent of cases no matter what the preliminary treatment. Bethea summarizes as follows:

To give the best results medical treatment must be instituted early.

The arsaphenamines and bismuth offer much promise of benefit.

A plan for postural drainage is discussed.

An abscess cavity is rarely, if ever, filled with lipidol by the ordinary methods of instillation.

Treatment with the bronchoscope is increasing in favor.

Pre-operative treatment of the mouth and tonsils is urged and a new device offered.

Proper localization of the abscess for operative approach is discussed and a new device is presented.

JONES, ROBERT M. The Surgical Treatment of Bronchiectasis. *Brit. J. Surg.* 21: 257.

The author reviews briefly the literature on the treatment of bronchiectasis and arrived at the conclusion that lobectomy is the most logical treatment. It is pointed out, however, that in the past the high mortality rate following lobectomy has made the use of this operation prohibitive.

Sixteen cases of bronchiectasis treated by lobectomy using a modification of Brunns' method are reported. Of these, six patients were cured (37.5 per cent) and five died (31.2 per cent). One other case not included in the sixteen previously mentioned was treated by the two stage method and died of broncho-pneumonia on the fifth post-operative day.

The causes of death in the five cases were: 2 patients died of broncho-pneumonia on the fifth and sixth post-operative days, respectively; one patient died of broncho-pneumonia, empyema and suppurative peri-carditis thirty-eight days after lobectomy, and in this case there was a rather extensive bronchiectasis throughout the remaining lobe which did not fill at the time of the preoperative lipidol injection. The fourth patient died after a secondary operation to close a bronchial fistula from hemorrhage from the internal mammary artery eight months after lobectomy. The fifth patient died of brain abscess fifty-two days after lobectomy.

Of the sixteen cases reported, 6 patients developed bronchial fistulas, 3 of which closed spontaneously, 1 required subsequent surgery to close it, and in 2 cases the patient died. Four of the sixteen patients developed empyemas.

The author feels that only those patients who have a unilateral bronchiectasis, who have been afebrile and free from attacks of pneumonitis for some time, should be subjected to lobectomy. After a careful study of his material he came to the conclusion that 40 per cent of his mortality was due to failure to observe these facts.

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QUERIES AND ANSWERS



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Q What are the daily caloric requirements of the average tuberculous patient?

A. The 'overstuffing' treatment of tuberculosis has fallen into disrepute. It is now felt that the average patient weighing 150 pounds requires from 2500 to 3000 calories daily. The individual peculiarities of the patient, the stage and activity of the disease, etc., must naturally determine the type of diet. A daily diet of 75 to 100 grams of fat, 100 grams of protein and 400 to 500 grams of carbohydrates would meet the caloric requirements of the average patient.

Q Upon what phenomenon does the tuberculin test depend?

A. The tuberculin test depends upon the allergic phenomenon brought about by a previous tuberculous infection which renders the cells sensitive to the tubercle bacilli or bacillary protein. If there has been no previous infection, there is no sensitivity, and the reaction will be negative.

Q What is the greatest predisposing cause to tuberculous infection in childhood?

A. A tuberculous infected environment is the greatest predisposing cause of childhood infection. Practically 100 per cent of children who spend their early years in contact with a tuberculous patient become infected.

Q Is amyloid disease of the kidney a common tuberculous complication?

A. Amyloidosis may occur in any prolonged general infectious disease accompanied by anemia and wasting. Tuberculosis of the lungs, bones or joints, supplies the conditions most favorable to its development.

Q Is tuberculin used as a therapeutic agent at the present time?

A. Yes, there are many specialists who use old tuberculin successfully. However, because there must be a very careful selection of cases, and, because the dosage must be carefully individualized in each case its use should be left in the hands of physicians who have had special training or experience with it.

Q What are the usual symptoms of intestinal tuberculosis?

A. Early symptoms are: Aversion to food, persistent nausea after meals, occasional vomiting of undigested food, indefinite pains along the large intestine, especially around the cecum, and alternating constipation and diarrhea. If these persist in a known tuberculous individual, tuberculous enteritis must be strongly suspected. Late symptoms are: a severe diarrhea of dark, foul smelling stools containing much undigested food, marked emaciation, severe abdominal pain of colicky type, and occasionally blood in the stools.

Q What is the incidence of tuberculosis of the intestines?

A. Autopsy findings show that from 80 to 90 per cent of the individuals dying from pulmonary tuberculosis show tuberculous ulceration of the bowels. It is probably safe to say that two thirds of the cases reaching an advanced stage of pulmonary involvement also have an intestinal infection.

Q What are the most important causes of lung abscess?

A. 1 Aspiration of a foreign body or of infected material from the upper respiratory tract as in abscess following tonsillectomy. 2 As a sequel of pneumonia. 3 Following lodgment of a septic embolus in the lung. 4 Secondary to a septic process in surrounding structures such as subphrenic abscess, or abscess of the liver—by direct extension. 5 Traumatic injury to the chest—especially penetrating wounds. 6 Secondary to amebic abscess of the liver by way of the hepatic vein and pulmonary artery.

Q Is hemoptysis always considered of tuberculous origin?

A. Hemoptysis occurring in the absence of any obvious cause should be considered a symptom of tuberculosis until proved of other origin. It may occur in cancer of the lung or in nontuberculous infections such as lung abscess, bronchiectasis, influenza, etc. Occasionally rupture of an aortic aneurysm into the air passages may be the cause. It is frequent in passive congestion of the lungs particularly in mitral stenosis. Rarely frank pulmonary hemorrhage occurs in pneumonia. Hemorrhagic diseases such as hemophilia or purpura hemorrhagica also must be borne in mind.

Q What are marginal rales and are they diagnostic of pulmonary tuberculosis?

A. Marginal rales are those heard at the extreme base of the lung and nowhere else and are not diagnostic of pulmonary tuberculosis.

Q What are the physical findings in bronchiectasis?

A. There are no definite diagnostic physical findings. The diagnosis is made by x ray, lipidol injections and the characteristic sputum, that is to say, sputum of the 'mouthful type' which separates into three layers on standing.

Q What are atelectic rales?

A. These rales are heard at the apex, sometimes during the first inspiration which follows a deeper cough than usual. Second or third cough will clear them away entirely, they are not diagnostic of any lung pathology.

Q Are all rectal fistulae tuberculous?

A. No. They are not invariably tuberculous. However, a rectal fistula occurring in a patient should warn the physician to make a thorough examination of the patient's chest and to obtain careful personal history.

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The first number of DISEASES OF THE CHEST is a very creditable one. If we can keep up this pace, it ought to go over big.

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C M HENDRICKS EDITOR IN CHIEF

(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"
 Lawrason Brown, M D

Editorial Comment

Tuberculin Skin Tests in Children GREAT PROGRESS will have been made by the medical profession, at large, in case finding and early diagnosis, if we will employ one of these tests in our diagnostic regimen. Each patient with a positive skin reaction should be at once sent for an x-ray examination. The x-ray film should then be studied and in each instance by a Roentgenologist who is experienced in reading chest films, or by the Medical Officer of a tuberculosis sanatorium, or by a tuberculosis specialist for a correct interpretation.

This procedure should be adopted by every physician. To accomplish the most for the greatest number, every contact of a tuberculous patient should have one of these skin tests. If positive reactions occur in individuals that are not apparently contacts, the milk supply of the family should be inquired into and the herd should be immediately tuberculin tested.

By tuberculin testing the physician will discover many active cases of tuberculosis that otherwise would go on to moderate or far advancement before the case is found. There is no doubt that difficulties will be encountered, especially by the rural practitioner, where he will find patients reluctant to incur the expense of the skin test and the x-ray, as well as the fee for the interpretation of the plates. We feel, however, that in most cases the physician could solve the problem by arranging to have the plates

studied and reported by some tuberculosis institution at no cost to the patient.

There are three types of this test: the Pirquet, Moro and Mantoux. The Moro test is by far the least sensitive, and has definite disadvantages for this reason.

The Pirquet test is made by scarification of the skin and the application of pure tuberculin with another scarification for control. If the Pirquet test is found to be negative it should be followed by an inter-dermal test (Mantoux) with a dilution of 1 in 100. In older children, if the inter-dermal test is still negative, it should be repeated with a dilution of 1 in 10.

The Mantoux test dilution of 1 in 10 should always be carried out with a control injection of the broth used in the preparation of tuberculin.

No Pirquet test should be regarded as positive unless there is at least one mm of erythema on each side of the scarified area.

The minimum required for a positive Mantoux test with any dilution is an area of erythema 10 mm in diameter, associated with some swelling to touch, or a well-defined erythema greater than this. Reactions showing an erythema 5 mm in diameter should be regarded as doubtful. If the reaction is doubtful on the fourth day, the test should be repeated with a stronger dilution than the control test. These tests are perfectly safe when the proper dilutions are used and any physician can develop the technique easily, as

all the reputable biological houses furnish these tests with full instructions for their application

The physician in the field could render a great service to himself and his community by adding the tuberculin test to his diagnostic regimen, in that he would greatly reduce the mortality of tuberculosis

C M H

Health Insurance and Tuberculosis THE AIR of the medical world is filled with talk of health insurance and state medicine. We need but follow the legislative articles in the Journal of the American Medical Association and its Bulletin to know that we, as a profession, are facing the most serious crisis in our history. The atrocious Wagner Bill before the National Congress, and the even more pernicious Epstein Bill which will be proposed in all state assemblies, are the products of the minds of sociologists who have delved into the report of the Committee on the Cost of Medical Care and have gleaned from it figures to suit their purpose.

The propaganda exploited by these sociologists has met a most receptive welcome at the hands of many discontented people who see the opportunity of getting something for nothing, and do not make an investigation of what they will actually receive under health insurance or of the cost of such insurance in taxes and payroll cuts.

Is the tuberculosis problem involved in this discontented attitude of the public toward the present system of medicine? Probably it is. Any chronic disease that costs so much in mortality and in economic loss — working time and money — must certainly be conducive to the general idea that perhaps a change would be for the better. The profession's record in controlling this disease—as good as the record is—seems to have been forgotten. The public wants to know what we will do with our tuberculosis problem *now* and *in the future*. It is to be hoped that this agitation will spur us on to a more determined effort toward early diagnosis

and proper treatment so that the white plague may eventually be wiped out. We still have a long way to go.

R.B.H.

Vital and Moral Resistance THE LONGER we observe and treat pulmonary tuberculosis, the more we realize that there are two important factors which we must take into consideration: vital and moral resistance. As yet we have no scientific means of measuring vital resistance, but any physician with experience and judgment can fairly estimate the vital resistance, as well as the moral resistance, which the wise and human Doctor knows well how to develop, if it be lacking.

Let the Doctor keep this ever before his mind, for as long as he has faith in the possibility of cure he can give hope and fighting power to his patient, if the patient is half a man, and by such psychotherapy he can accomplish miracles.

Would that some scientific investigator might find the measure of the vital resistance in any case and show us how to develop it. That finally we shall solve this riddle, I doubt not. Meanwhile it is in the power of any Doctor who takes a live interest in his patient and regards him as a human being and knows how to discover the secrets of his heart, to bring to him aid in his fight such as rest or surgery alone cannot give. Fill our patient's heart with hope, and we double the fighting force of every cell in his body. Teach him to smile, and we wake up a sunlight in his heart which is the best heliotherapy. Rouse his will power to co-operate with us, and our task at once becomes easier. What would the results of our sanatoria be if we could banish the many pitiful and unusually concealed anxieties and troubles which are too often gnawing at our patients' hearts and holding them back, and lessening their fighting force?

What discoveries the future may bring to us we cannot know, but while we are far from having attained the control over tuberculosis of which we dream, the results of the modern treatment are so good

that, granted an early diagnosis and that fundamental resisting power which the majority of our patients have, there is no excuse for pessimism in our attitude, save in the minority of cases. The hygienist by his prophylaxis is cutting down its incidence and improving the constitutions of those who may fall its victims. The general diagnostician is infinitely more capable of discovering its early manifestations than the very best man in our profession was thirty years ago, and the therapist, having thoroughly mastered the few but powerful measures at his disposal, is returning more and more well-trained, dependable patients to a normal, useful life.

C M H

Lime Starvation IT HAS become a by-word that the tuberculous individual is commonly a sufferer from lime starvation. Evidently the change brought about in the chemistry of the tuberculous favors the loss of calcium salts, and interferes, in some subtle fashion, with the capacity of the body to fix these minerals, and to retain them in the chemical economy. This condition is sometimes referred to as a "negative calcium balance."

One of the reasons that milk has become so important a part in the therapeutic dietary of the tuberculous is because it is, perhaps, the best and most convenient source of lime salts, and, as is generally acknowledged, lime is one of the most needed minerals in tuberculous disease.

The study of the mineral metabolism of tuberculosis, and the appreciation of the importance of lime starvation, have aroused considerable interest in the parathyroids. Some men believe that these little glands have a remarkably active lime-fixing power, or that they produce a mordant whereby the body is able to retain lime salts which otherwise would be excreted. It has been suggested by others that thyroid therapy with lime might be a useful procedure in the treatment of tuberculosis. Recent literature on the sub-

ject, however, has not been very encouraging.

C M H

Lung Abscess and Pulmonary Gangrene THE DIFFERENTIAL diagnosis between pulmonary abscess and pulmonary gangrene is very important. Many cases of pulmonary gangrene are diagnosed pulmonary abscess and vice-versa. Correct diagnosis has a marked influence on the prognosis of the disease.

It is well to remember that the sputum in cases of pulmonary gangrene is foul smelling, greyish brown or greyish green and contains characteristic oral spirochetes and fusiform bacilli, while in true cases of pulmonary abscess the sputum is a whitish yellow, muco-purulent or purulent, without appreciable odor and contains the usual pyogenic organisms, most often staphylococci. Statistics show that pulmonary gangrene occurs most always in adults and is three times as frequent as aspiratory abscess. It is seldom found in children, this age group shows a predilection to lung abscess. Pulmonary gangrene when recognized early can almost invariably be cured by the administration of arsphenamine, although pulmonary gangrene is a much more severe process than pulmonary abscess. There is conclusive evidence that pulmonary gangrene is caused by a group of organisms, notably spirochetes, fusiform bacilli and vibrios, aspirated from the oral cavity. The differential diagnosis therefore depends on a careful examination of the sputum.

C M H

Nearing the Goal AS HOPELESS as it seemed twenty years ago, the protection of the population against the menace of the open case, is now nearing a realization. With seven hundred sanatoria and eighty thousand beds now available one can visualize what a marked effect on the incidence of tuberculosis could be had in the next generation if all these beds could be used for open cases only. We would then be approaching our long sought goal, viz, the principle of *contagious disease control*.

C M H

The Tuberculosis Patient

WHEN TUBERCULOSIS is suspected by an individual or when this same patient feels run down and in need

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of a spring tonic, the family physician flashes before the mind and is immediately consulted. We assume that all family physicians are good doctors. We take it for granted they are painstaking and thorough in their examinations. We believe when they are ready to impart their conclusion to the invalid they have given the best advice that is within their ability to render. And if we are right in our assumptions, the patient is fortunate indeed.

However, we must be wrong in admitting that all family physicians are careful doctors.

Else, why do 80 per cent of tuberculous patients discharged from one institution of excellent standing die within three years of discharge?

Why are 60 per cent of cases coming west in search of climate in the far advanced stage of the disease?

Why do 47 per cent of these same patients die within six months of arrival?

The answer to the foregoing questions is Lack of early diagnosis. Tuberculosis to be cured must be diagnosed early. Ninety per cent of early type cases get well, the other ten per cent die because of poor advice or because they did not take good advice. The family physician is the first line of defense against a beginning tuberculosis. If he fails, the story is a long drawn-out fight against overwhelming odds, usually ending in hopeless invalidism or, far better, the grave.

Too many busy practitioners are heedful of their time at the expense of the patient. They ask a question or two, write a prescription, walk to the door, and ask for the next victim, all in the space of a few minutes. The individual seeking advice may have had nothing organic the matter or he may have been dying of cancer. As far as his doctor's

contact with him was concerned, certainly the doctor was none the wiser. One cannot see dozens of pa-

tients in the course of an afternoon at the office and give intelligent advice.

A medical friend of mine once said "Deliver me from the busy doctor. He never has time to find out what's the matter with a patient." And there is much to be said on that side. On the other hand, if we selected our medical adviser by that rule, we should no doubt take up with one who had little practice due to his natural dumbness. In the final analysis, the patient and not the physician gets the wrong end of the wishbone.

What the reliable and competent family physician needs to remember is to give sufficient time to the new patient to arrive at some definite conclusion. If today is too full of work, have him come back. No one is expected to make a diagnosis in one interview unless a label from objective symptoms stares you in the face and only a blind man could miss it. A carefully taken history is a big asset. Only recently a boy came to my office giving a history of having been treated by three physicians over the past two months for a bronchial cold. From the history, it was easily learned that shortly after his cough began he suddenly spit up a large quantity of foul-smelling and foul-tasting pus. Physical examination revealed numerous rales at the lower angle of the scapula, and X-ray confirmed the diagnosis, made from the history alone, of abscess of the lung.

Too many cases of lung abscesses are given the diagnosis of bronchitis, early tuberculosis, and what not. Careful checking by X-ray and laboratory, and in the majority of cases by history alone, will help to make the diagnosis positive.

Another bugbear is the toxic goitre. My records are full of patients with this condition sent west for an early tuberculosis simply on the finding of a low-

grade afternoon temperature and a rapid pulse. The X-ray and physical examinations are both negative as far as tuberculosis is concerned, yet a pulse rate and temperature chart is sufficient for the busy man to hang tuberculosis on the victim, when a further study would have revealed the true state of affairs.

Beware also of the case of bronchiectasis. This has labeled many unsuspecting people with pulmonary consumption. Here X-rays with lipidol and carefully checked sputum give vast information and save the doctor much embarrassment.

Malignancy of the lung is more cause for grief, and here one may be pardoned for thinking of everything else until the X-ray begins to tell the story. However, one's inability to pin a definite diagnosis in an obscure pulmonary affair should suggest new growth as a plausible possibility.

The rare lesions due to fungi need worry no one. They are met so infrequently that confusion seldom results.

Pulmonary fibrosis due to occupational diseases as silicosis and pneumoconiosis are usually cleared up by history, X-ray and laboratory examination.

Now let us consider the great stumbling block in differential diagnosis, namely, the case of chronic nervous exhaustion. For years I have maintained that there are born into this world people with subnormal endurance. The gentler sex predominates, but males are also encountered. They present a symptom complex that in itself is almost diagnostic. After you have listened to their story you might as well conclude that no organ of the individual's anatomy has escaped untouched. The numerous aches and pains begin with the hair on the head and end at the toe nails. Chest pains come in for their share of the picture, and especially a pain at the angle of the scapula. This is so common and so constant after exertion that I choose to call it a fatigue pain. Add to this vast array of symptoms a low-grade afternoon temperature, plus under-nourishment, a mildly accelerated pulse on exertion, and marked fatigue at the end of the day, and

you will find that 90 per cent get a diagnosis of pulmonary tuberculosis, usually of the hilum type, hung onto them, this in the absence of X-ray, physical or laboratory findings to back up the assumption. A carefully taken history will show that the majority of these patients have been in this same chronic state for years. This fact alone should make one suspicious that organic disease does not exist. True, all patients of this type should be carefully studied and other possibilities such as toxic goitre ruled out before definite conclusions are reached. This class of patients makes for excellent sanatorium results and I suppose their incarceration in an institution temporarily saves them from the surgeon's knife, since this branch of medicine usually removes most of their internal workings in a vain endeavor to cure all their imaginary ills.

The foregoing remarks on differential diagnosis are offered to show the family doctor the errors that come to the specialist in pulmonary disease, and not with the idea of making a phthisiologist of him.

It is much better to err on the right side than the wrong, but it is also unfortunate to hang a diagnosis of tuberculosis on an individual in whom it does not exist.

The general practitioner must of necessity see the patient first in the majority of cases. He must exercise ordinary intelligence in the management of the case. He may in justice to himself and patient watch the early type for a time, and if improvement is consistent keep on with the case. If not, reference to a specialist is indicated.

The progress in the treatment of tuberculosis in the past decade has been so rapid that the general practitioner could not be expected to keep pace with it. That, however, does not excuse him from availing himself of the benefit of consultation.

To the old regime of rest, fresh air and good food has been added the so-called compression therapy. In the early days

(Continued to page 21)

Cough as indicated in its definition and physiology is a defense mechanism, nature's effort to free the respiratory tract of noxious agents. As so often happens nature's effort may overshoot the mark and the defensive role becomes offensive or destructive. Cough may be very annoying or even painful, interfering with the patient's rest and sleep—and often with that of his neighbors. It is a considerable waste of energy and produces wear and tear upon the sufferer. It has been estimated that the energy in a day of hard coughing is equal to that consumed in climbing a tall mountain. Only cough which sweeps offending material from the respiratory tract serves any useful purpose and an attempt to repress all other should be made.

The treatment of cough naturally depends to a large extent upon its cause. The best cough medicine for the cough in early tuberculosis is bed rest. Laughing, loud talking, getting chilled, becoming overheated, faulty ventilation, insufficient fresh air, all tend to increase cough and therefore the proper regulation of these factors should be given much consideration in one's therapy. The exercise of the will-power is very effective in controlling cough in many instances. A few swallows of water will at times cut short a coughing spell. In cases of abscessed cavities with broncho-fistulae nothing gives as much relief and freedom from cough for hours as postural drainage. In many cases of chronic diffuse bronchial affection such as those associated with asthmatic states, emphysema, bronchiectasis, chronic sinusitis, etc., I have obtained nice results by the prolonged exhibition of mixed catarrhal vaccine and exposure to the ultra-violet rays. Also in these cases some form of iodine and calcium has seemed of value. When the general health has been undermined, as in the chronic cases, attention to the upbuilding of the patient is necessary to secure the best results. Various hardening processes, cold douches to the chest, graduated sun baths, all have their place in the therapeutic regime. Among the drug measures we have

recourse to sedatives, opiates, expectorants, lozenges, inhalations, sprays, and applications to the chest. Digitalis will often clear up a so-called bronchitis. This last statement prompts me here, before I conclude, to make a digression, and it is this. More and more as our diagnostic procedures and understanding improve, the ranks of chronic bronchitis dwindle. We are coming to find that these cases are proving to be ones of overlooked tuberculosis, mild bronchiectasis, asthmatic states, pulmonary neoplasms, and a weakening myocardium.

This concludes my discussion of this subject, cough. I have attempted no exhaustive monograph on the subject and realize it is sketchy and leaves much to be said. I have attempted merely to call attention to some of the clinical and practical aspects that I have observed in my own experience, and which I hope will be of some help to some of you.

MACKLIN, CHARLES C, M. D. *The Dynamic Bronchial Tree.* *Am Rev Tuberculosis*, 1932, xxv, 393-417.

An attempt is made to visualize the *locus* of pulmonary tuberculosis. The purely conducting part of the bronchial tree (that is everything up to, and including, the fine, smooth-walled bronchioles) is envisaged as undergoing a lengthening with inspiration and a shortening with expiration, and the details of this process are explained with diagrams. The peculiar shape and mode of action of the pleural cavity make it necessary to shift the lower part of the lung during inspiration in a downward, forward and outward direction, if the part above and behind the hilum is to expand properly. The root of the lung is of very great importance in this movement, of which the reverse phase is seen in expiration. It is suggested that the normal flexibility of the root may be impaired from disease processes, and that this will hamper lung ventilation, especially in that part lying above and behind the hilum. The advisability of ascertaining the normal range of movement in the root, particularly in children, is stressed, and the possible relation of interference with this movement to pulmonary tuberculosis advanced. (Author's abstract.)

Laryngeal Tuberculosis and the Electric Cautery

TUBERCULOSIS IN any form is of vital importance to all physicians. Laryngeal Tuberculosis is of especial importance to the Laryngologist who practices his specialty in a health center or is on the staff of a Tuberculosis Sanatorium. Modern treatment of Laryngeal Tuberculosis has been so successful that we laryngologists should now assume the management of this complication.

Etiology

Laryngeal tuberculosis is to be found in a rather large percentage of cases of pulmonary tuberculosis and in most cases is secondary to that condition. Statistics show that laryngeal involvement varies from 12 to 45 per cent, depending on whether the pulmonary condition is an early or advanced one. The infection is thought to take place most often through the lymphatics, or from infected sputum passing over an abraded surface of the mucous membrane.

Symptoms

A patient with pulmonary tuberculosis who experiences change in the quality of the voice coming on gradually after cough or excessive use, or whose voice tends to tire easily, often exhibits early symptoms of laryngeal involvement. Pain depends much on the location of the lesion. The vocal cords and other structures within the larynx may be seriously involved, with little pain, while a slight lesion of the epiglottis or aryepiglottic folds might produce much discomfort. Acid foods and liquids cause the pain.

Pathology

The earliest lesion to be seen is a slight thickening of the mucous membrane, which becomes more prominent on phonation. The early lesion is more often seen in the posterior commissure or interarytenoid space, and next most often on the vocal cords. Regardless of location,

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the first evidence noted is an infiltration, then an edematous swelling in loose tissue, and later an ulceration. Stephens (7) defines tuberculosis lesions in the larynx as consisting of infiltrations, ulcerations, perichondritis and tuberculomas. Tuberculosis in the larynx, as elsewhere, begins in the formation of a tubercle. The mucous membrane over the tubercle becomes destroyed and an ulcer results.

According to most authorities, when the tubercle bacillus comes to rest in a tissue, the fixed connective tissue elements are stimulated, causing a production of epithelioid cells. These cells clustered around a central area are elongated in shape and form the most constant feature of a tubercle. This cluster of cells is surrounded by an inflammatory zone of mononuclear cells, lymphoid in type. In the center of this mass is often found a giant cell, consisting of a large mass of protoplasm containing many nuclei. Such a tubercle is without blood supply and the center undergoes necrosis, due as much to the lack of blood supply as to the toxins of the tubercle bacilli. Healing of such an area may take place by the deposit of calcium salts in the necrotic area and the formation of a dense surrounding capsule, or by a stimulation of the fixed connective tissue cells and a changing of the epithelioid cells into fibroblasts, whereby fibrous tissue is formed in sufficient amounts to encapsulate the lesion. Ulceration and infiltration are superficial until secondary infection takes place.

Diagnosis

In a lesion of the larynx, the three conditions most often confused are tuberculosis, syphilis, and cancer. It is possible for any two or all three conditions to be present at the same time. However, in

the great majority of cases, a laryngeal lesion is tuberculous if there is tuberculosis in the lungs. A syphilitic ulcer is sharply defined with clean-cut edges, and the Wassermann and therapeutic tests are of decided value. It is not always easy to distinguish a malignancy from a tuberculous lesion, because it is not uncommon to have a cancer in a patient suffering from tuberculosis. A cancer is more prone to attack the middle or anterior third of the vocal cords, while tuberculosis primarily attacks the posterior commissure and adjacent parts. Biopsy would be positive but is dangerous in tuberculosis and also in cancer, unless one is prepared to do the necessary surgery at once.

Prognosis

It has been stated that tuberculosis of the throat diminishes a patient's chances of recovery by nearly 50 per cent. Forty years ago, Morrell McKenzie stated "It is not certain that any case of tuberculosis of the larynx has ever recovered."

Tuberculosis of the larynx, as a rule, progresses much in keeping with the condition of the lungs, although there is many a patient whose larynx has steadily improved while his lungs were growing worse. This is frequently true under present-day treatment. However, a laryngeal involvement is always serious and especially if extrinsic and involving the epiglottis and aryepiglottic folds.

Modern treatment has greatly improved the outlook in laryngeal tuberculosis.

In studying the lists of patients cared for during the past several years in El Paso's institutions for tuberculosis, I am surprised at the small percentage who have had laryngeal tuberculosis. At the William Beaumont Army Hospital there have been admitted 2,450 cases of tuberculosis since 1921, and of that number only 80, or $3\frac{1}{4}$ per cent, were diagnosed as having laryngeal tuberculosis. Most of these patients were ex-service men, varying in age from 30 to 50 years, with a rather high degree of immunity.

The private sanatoria of El Paso—Hendricks-Laws, Homan, Long, Price, and St

Joseph give percentages of laryngeal tuberculosis varying from 12 to 20 per cent. In 2,066 cases of tuberculosis treated in Homan's, 13.2 per cent had laryngeal tuberculosis. In a summary of 500 cases St Joseph Sanatorium reports 7 per cent who had definite ulcerative lesion and probably that many more who had infiltrations. Hendricks-Laws Sanatorium reports that 12 per cent of their patients have had some degree of laryngeal tuberculosis.

Treatment

An early diagnosis goes far in the successful treatment of laryngeal tuberculosis. The laryngeal mirror should be used whenever an examination of the chest is suspicious or positive for pulmonary tuberculosis, and the throat should be examined once each month thereafter as long as the pulmonary lesion is active and advancing.

A large percentage of very early cases will clear up merely by rest of voice together with proper general care. In these early cases the patient should be put on whisper, and if definite improvement does not follow in two or three weeks, then the doctor should insist upon silence and the use of pencil and pad. These cases many times are greatly benefited by exposure of the larynx to sunlight by means of the metal Verba mirrors. If, in spite of these methods of treatment, the infiltration increases or an ulcer develops, or if an ulcer is present at the first examination, there is no therapeutic agent known to science at this time which approaches in effectiveness the electric cautery. Most of the country's leading laryngologists highly favor this method of treatment. All value rest of the larynx above everything else, but, when this is not effective, we have a remarkable agent in the electric cautery.

Fetteroff (1) mentions the experimental work done by himself and George B. Wood in 1910 and 1911. Guinea pigs were inoculated with the tubercle bacilli and the resultant lesions cauterized with the electric cautery. It was found that an inflammatory zone developed around the

area destroyed—newly formed blood vessels and fibroblasts. In six days the reaction was more marked, blood vessels were more numerous and there were larger deposits of fibrous tissue between the epithelioid cells and the tuberculous mass. In twenty days the lesions were almost healed. They concluded that any thing which aids the cicatrization of a tuberculous nodule by the formation of fibrous tissue is of definite value in the cure of the disease.

Pryor (2) regards rest of the voice as the most valuable procedure in the treatment of laryngeal tuberculosis, regardless of what other type of treatment is used. He also mentions the sunlight treatment by the use of the Verba mirrors manufactured in Colorado Springs. There are some cases which this type of treatment does not help, and it is in such cases he relies on the electric cautery. He states that with this agent most spectacular results are noted in the relief of pain.

Kellam (3) states that the specific results following the skillful and judicious use of the electric cautery in the treatment of laryngeal tuberculosis, bear a similar relation to this complication as insulin to diabetes and arsphenamine to syphilis. He concludes that the electric cautery has largely superseded curets, heliotherapy, and acid applications, in the treatment of tuberculous ulcers, infiltrations and granulations, and that the pessimism which heretofore has doomed every case of ulcerative laryngeal tuberculosis to death is not justified.

Terry (4) follows one of two lines of treatment when a diagnosis of laryngeal tuberculosis is made—rest of voice, or electric cauterization. Disturbing the patient for frequent examinations or various local applications is as much contra-indicated as the too frequent removal of surgical dressings from a healing wound. The electric cautery is the best method of treating the tuberculous lesion which fails to yield to voice rest. With early lesions, complete healing is the rule after a few cauterizations. With most of the advanced cases it is the most efficient meth-

od for the relief of the excruciating pain and enables the patient to take much needed food. Many times healing will take place following cauterization of extensive lesions.

William C. Warren, Jr. (5) thinks all laryngeal tuberculous should be in a sanatorium so as to carry out properly silence treatment, and if this does not cause improvement then the electric cautery should be used.

Looper and Schneider (6) state that, for the active treatment of the tuberculous larynx, they have found the use of the electric cautery most beneficial and employ it in preference to all other methods. Early cases clear up after two or three treatments and advanced cases show marked improvement after a few cauterizations. In severe and hopeless cases, the cautery is of great value for relief of pain and coughing. Many local applications have been tried and abandoned. In the treatment of 500 cases of laryngeal tuberculosis, the electric cautery was found to be the best treatment and, of all cases, 65.5 per cent were improved and healed, and 26 per cent were improved and healed in far advanced cases.

Stephens (7) states "Of all methods of local treatment none is so productive of benefit as the electric cautery."

Glenn and McGinnis (8) speak of the good results obtained by many men in treating tuberculosis of the larynx with electric cautery, but prefer the use of the water-cooled mercury quartz light by means of specially made laryngeal mirrors, because this method requires less expert manipulation of instruments.

Spencer (9) states that electric cauterization offers a valuable means of destroying both ulcers and tubercles and it is doubtful if any method of treatment has yielded better results than cautery.

Sharp (10) recommends vocal rest for all patients who have definite signs of tuberculosis in the larynx, and the electric cautery where there is a tuberculoma, infiltration, ulceration or edema. The quartz light has not been of value to him.

Muskat (11) considers, in the combat of laryngeal tuberculosis, rest of the voice most important, and the electric cautery when this has failed

Briggs (12) says that the electric cautery is proving by far the greatest means of combating the lesions of laryngeal tuberculosis and especially when other treatments are not promising

Green (13) has done much work in treating laryngeal tuberculosis with the electric cautery and is getting excellent results

Looper (14) states that with the electric cautery we can accomplish in one application what could be gained by weeks of silence, and, as soon as a tuberculous lesion of the larynx is recognized, cauterization should be applied if the patient's general condition will permit it

Brown (15) considers the electric cautery the best therapeutic agent we possess in tuberculous ulceration of the larynx

St Clair Thompson (16) speaks of the older writers' considering the recovery from laryngeal tuberculosis as improbable as we now consider recovery from tuberculosis of the meninges. Early cases are given two or three months of silence before resorting to the cautery. When healing is stationary or slow, or where the patient is not able to wait the necessary time, the cautery is used. Of 477 cases of laryngeal tuberculosis, twenty-three recovered with silence, fifty on whisper and forty-six with the use of the electric cautery

Wood (17) states that the electric cautery is undoubtedly the best surgical method of treating laryngeal tuberculosis, and the results attending its proper use have taken this disease out of the list of laryngological nightmares. The object of cauterization is the production of a scar rather than the destruction of all tuberculous tissue, and this fact makes the procedure a comparatively minor affair. With the possible exception of very large tuberculomata and completely diseased epiglottis, all the clinical types of localized tuberculous lesions are more successfully com-

bated by the cautery than by any other form of treatment

In my personal experience during the past three years, I have seen close to a hundred cases of laryngeal tuberculosis, and of this number have used the cautery in about 50 per cent of the cases. In the early cases, rest of the voice will often effect a cure where there is a tendency for improvement of the pulmonary lesion. Many of these cases have received definite relief by use of the Verba laryngeal mirror, which enables the patient to reflect the sun's rays into his larynx. Often very painful throats experience a sensation of warmth and comfort after the use of heliotherapy. It has been my practice to subject patients to rest and heliotherapy unless there is ulceration present on first examination or one develops in the course of more conservative treatment. I then use the electric cautery. However, I am coming to believe that many cases of infiltration would more quickly heal if the sharp-pointed cautery were used early and plunged into the more prominent areas of infiltration. In ulcerations I have little faith in applications, rest of voice, or any other treatment except the electric cautery. I grant that a few such cases get well by the treatment of "watchful waiting" but the healing process is greatly hastened by use of the cautery in the early and moderately advanced cases, and the relief from pain in the far-advanced cases is more pronounced than by any other method at our disposal. All of us see cases who seem doomed from the start—patients who have little resistance and whose pulmonary and laryngeal lesions advance in spite of all that can be done. These are the cases we can often give the most wonderful relief by use of the cautery. However, in the very sick patients, we must be careful not to overtax them with too many applications. These patients are often given relief by the application of the cautery to one or two painful areas.

Technic

Except in the very nervous and apprehensive patient, no preliminary medication

is used At times we have given 1/8 or 1/6 gr morphine by hypo, three-quarters of an hour before using the cautery

The very sick patients are allowed to remain in bed, as the illumination and necessary instruments are easily arranged by the bedside The indirect method is far preferable to the direct and just as easy after a little practice A 10 per cent solution of cocaine is applied lightly to the pharynx and soft palate, and with a curved applicator 10 per cent cocaine is then applied to the epiglottis In a few minutes the arytenoid and posterior commissure are touched and, if the vocal cords are involved, they are also cocaineized As a rule, anesthesia is sufficient after 10 minutes, if not, more cocaine is applied For the deeper ulcers and infiltrations, a sharp-pointed cautery tip is used, and for the broad ulcers, a rather flat cautery In this first case the cautery is plunged rather deep into the infected tissue, while in the second, the ulcer is seared rather superficially The point should be heated almost white hot so the tissues do not stick to it It is the reaction to the burn, and not the destruction of all the tuberculous tissue, we seek, and for that reason we should be gentle in our manipulations, and make it a point to do too little rather than too much From one to five cautery applications are, as a rule, all the cauterization we should do at one sitting The procedure may be repeated in two to four weeks One should avoid cauterizing deeply in the region of the cartilaginous joints, especially the crico-arytenoid, for fear of producing an ankylosis

As a rule, pain and discomfort are markedly relieved after use of the cautery At times, there is some pain for a day or two, requiring sedatives, but this is seldom the case if we do not attempt to do too much at one sitting

Since using the cautery, there are few cases I feel are hopeless until I have tried this method, and these hopeless cases are generally much relieved, both physically and mentally, by its use. I have seen a few far-advanced cases get entirely well by the use of the cautery

Summary

1 Laryngeal tuberculosis is a complication of pulmonary tuberculosis in from 12 to 45 per cent of cases, depending on the severity of the pulmonary lesion

2 The tuberculous lesion is healed by the deposit of calcium salts in the necrotic areas and by an increase of fibrous tissue which develops from the fixed connective tissue cells, and probably by a changing of the epithelioid cells into fibroblasts Such healing processes are encouraged by an increased blood supply

3 Rest is important in all cases of laryngeal tuberculosis The electric cautery is used in all tuberculous ulcers, and infiltrations which do not respond to rest of the larynx Heliotherapy is used in many cases

4 The electric cautery heals, not by the destruction of all tuberculous tissue, but by the development of an inflammatory zone in which newly formed blood vessels and fibroblasts are produced, which hastens healing by cicatrization

5 Most early cases heal with the cautery, while the advanced cases are relieved of pain

6 Electric cauterization is a minor procedure, done best under cocaine anesthesia and by the indirect method

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Sanatorium Versus Home Treatment For Pulmonary Tuberculosis

TO INTELLIGENTLY discuss this subject, we must have clearly in mind the treatment of pulmonary tuberculosis as it is understood today

BY
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and physician and that enables the patient to relax and take the cure with an enthusiastic optimism

Scores of specifics for the treatment of this disease have been tried and all have been found wanting. Notwithstanding, pulmonary tuberculosis is recognized at the present time as the most curable of chronic diseases. It is cured not by specifics or medicines, but by a mode of life, dependent upon a clear visualization of the patient's disease processes and by an intelligent supervision of all the details which have to do with the physical exertion and the mental and emotional reactions of each individual patient.

Since the disease is individual in its manifestations, the treatment must be individual. The first essential in the treatment is to control the mental and the emotional state of the patient, without which the physical reactions cannot be controlled. To carry out these essentials, we must first be able and have an opportunity to thoroughly study the patient and his disease processes and, in addition, we must be able to place the patient in an environment that will assist him to the fullest extent in adjusting his psychic reactions to the circumstances.

Does the home or the sanatorium, then, offer the best circumstances for the treatment of the patient with pulmonary tuberculosis?

Dr E B Emerson of Rutland Sanatorium says, "The first step in the treatment of a tuberculous patient is his education, carrying home to him the truths of all he must know and apply with all the zeal that he lives his religion."

It is the uncertainties in life that make us worry. So it is with a tuberculous patient. The truth may be a shock to him at first, but, at the same time, it is this truth which establishes that bond of confidence that must exist between patient

To properly educate the patient who remains in his home is about as difficult as it is to secure a college education without going to college. If the patient is to develop new health habits, they must be repeated and rehearsed and exemplified as in an institution. In the home, the busy physician, through lack of proper opportunity for adequate observation and study of the patient, is seldom able to outline the necessary regime. Under those conditions, the meaning of the word rest or the word cure for those sick with tuberculosis is not fully explained or appreciated nor are definite rules laid down or followed. In other words, the essential details which, in general, determine whether the disease retrogresses or progresses are most often neglected.

Again, in the home there are countless things that arise in a life under such conditions which tend to upset and disturb the patient so as to make it next to impossible for the average person to follow a correct regime even if it were outlined. At home, the patient is alone among well people who have little or no realization of the number or importance of the limitations that must be placed on the patient or the length of time that these limitations must be carried out.

A person sick with tuberculosis, as a rule, is unusually nervous and easily upset so that even devoted members of the family living, especially for long periods, under the same roof, due to their failure of appreciation of the patient's condition, may be, and often are, sources of serious disturbance.

Likewise, in the home, well-meaning as well as curious friends flock to see the patient. They feel it their duty to entertain him by relating all the latest and most exciting gossip as well as their own

troubles and, also, they must offer their own opinions as to what the patient should do. They leave the patient exhausted physically and nervously and with his faith in his doctor and the treatment he has outlined faltering. The average family, for fear of giving offense or for other reasons, is helpless in the control of visitors.

In addition, at home the patient is the recipient of all the disturbing trivialities that take place in every family.

Finally, in the home, because of lack of understanding, the usual slight upsets in a patient's condition bring terror to all the household as well as to the whole neighborhood, with the resulting serious upsets in the calm and confidence of the patient.

In considering this subject it should be understood that a sanatorium is not just a place for the patient to sleep and board and have the more or less impersonal attention of a nurse and a physician. It is an atmosphere in which contentment is the dominant factor, and this atmosphere reflects the character of the physician in charge.

When a patient leaves home to go to a sanatorium, he does so, for the most part, with the feeling that he is going to give himself a better chance to get well than he would have at home. This feeling is enhanced by new scenes and surroundings which inspire an enthusiasm which is often found wanting in the confines of the home. The feeling on the part of the patient after reaching the sanatorium, that he is in an environment of mutual sympathy and moral support, makes it easier for him to reconcile himself to the detailed routine of the cure. Under these conditions, he is more likely to be endowed with that "will to recover," and this "will to recover" on the part of the patient is a powerful weapon in the hands of the physician who appreciates it and is schooled in the art of maintaining it.

The patient in a sanatorium profits by the examples and mistakes of the other patients, and the power of these examples and the power of the correct mass psychology are a tremendous force in

bringing about a reconciliation and an adjustment to the necessary routine. Education and information acquired in such an atmosphere are the keystone to the discipline which is so essential in the proper treatment of pulmonary tuberculosis.

Grouped as the patients are in a sanatorium, the physician has more time and opportunity to study them and to understand their individual disease processes and their psychical reactions. As a result, he enters into his work with an enthusiasm which inspires confidence.

Again, the intelligent sanatorium nurse, through her training and experience and by a virtually twenty-four hour contact, understands the tuberculous patient and contributes to an inestimable degree to the ability of the physician to properly understand and direct his patients.

In the sanatorium the patient has a much greater opportunity to be protected from the nervous and over-anxious members of his family and the disturbances which occur in the ordinary routine of the home. The patient's friends and relatives are made to understand that he has just one business and that is to get well and that he is not there to visit or be visited or to entertain or be entertained or advised by them.

Finally, in the sanatorium the patient learns that flareups in the course of pulmonary tuberculosis are more or less the rule and when these occur in his case, his reaction is entirely different from that of the patient having a similar experience in a home environment.

In conclusion, I realize that there are not at the present time facilities for all patients with pulmonary tuberculosis to take the cure in sanatoria. But I do feel that when the public and the medical profession, as a whole, appreciate the value of patients' having an opportunity to at least begin the cure in a sanatorium, that is, a sanatorium which is worthy of the name, and thereby learn the details essential for their recovery before they are advanced cases or hopelessly ill, the results of the treatment of pulmonary tuberculosis will be vastly improved.

Transfusion of Blood in Tuberculosis*

THE REPORT of this small group of blood transfusions in tuberculosis is presented in the hope that it will

BY
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stimulate both discussion and use of an agency in the treatment of tuberculosis which we believe has a greater value than it has been credited with. The suggestion came from our laryngeal department that the pallor of the pharynx and larynx, with or without mucous membrane lesions, which is so common in the tuberculous throat, might suggest the use of transfusion. The cases selected presented symptoms such as hemoptysis, marked secondary anemias, the throat picture above described, and other evidences of progressive activity not improved after long observation and varied treatment. As will be subsequently noted, they were nearly all in the third stage.

A review of the literature since 1667, when John Baptist Dennys reported the first authentic blood transfusion on man, reveals few and feeble efforts with this procedure, as far as tuberculosis is concerned. In 1921, Fieich reported indifferent results on six tuberculous patients transfused with 100 to 375 c c of blood at weekly intervals with from two to five treatments for each. In the American Review of Tuberculosis, January, 1929, Gamble reports a few cases of tuberculosis so treated with gradual improvement in appetite, hemoglobin, and general condition.

In our series comprising fifty cases, the donors were selected by the ordinary Moss classification. Cross matching was used in only a few of the recent cases. All had negative Wassermann reactions and care was taken as to their history and general clinical findings. The Lewisohn indirect method with citrated blood was used, and 500 c c given in most instances, and while it is true that some of the series coincidentally received other treatments such as

tuberculin, heliotherapy, and pneumothorax, we believe that the blood transfusion as an adjunct to

their treatment had such definite value as to merit careful consideration. In a large percentage of this series the favorable improvement following the transfusion, in comparison with the unsatisfactory course they had experienced through long observation before transfusion, was certainly more than ordinary and in a few cases even spectacular.

With the assistance of Dr. Leroy Elrick, we have tabulated and classified both the immediate and subsequent individual symptoms and results in this entire series of cases over a period of seven years, but realizing both the confusing and misleading effect upon the listeners' mind of detailed symptoms, numerically expressed, I shall attempt to give you only the outstanding features of final results, both favorable and unfavorable, which seem to me to have been influenced by the transfusion. To put it in a condensed form it is clear to me that thirty-one of this series of fifty cases were materially improved by the transfusion, eleven were apparently unchanged, while five progressed unfavorably, and three had an anaphylactic reaction and were probably injured by the procedure.

A striking feature of the improved class was the *progressive* improvement in the blood picture. In almost every case the red cell count and the hemoglobin gradually increased for over a month. The polymorphonuclear cells were temporarily increased at the expense of the lymphocytes. The improvement in the laboratory findings was made more significant by the clinical observations of improvement in the temperature, pulse, cough, sputum, weight, and color of the skin, nails and mucous membranes. The sense of well-being with its associated cheerful mental attitude also deserves mention. These

*Read at a meeting of the Denver Sanatorium Association March 28, 1933 at The Swedish National Sanatorium, Denver, Colorado. Reprinted from Colorado Medicine October 1933. A Report of 50 cases.

features of improvement extended over much more time than one might ordinarily expect from a transfusion and seem to logically support the hematopoietic action of the new blood

In consideration of the cases with unfavorable results, it should first be noted that they were all in the third stage, presenting extremely active and progressive symptoms, but the anaphylactic reactions we regret to record might possibly have been avoided by more careful cross agglutination. One of these died in seven hours after the transfusion, another in one month, and the third in seven months.

Small transfusions of 15 to 20 cc have seemed of real value in hemoptysis. We had four who stopped bleeding immediately, one shortly after and one in two weeks. Three of these have had no hemorrhage since, one had hemoptysis one year afterward, and two were recent cases.

We observed chills and fever of varying degree after the transfusion in thirty-seven cases, which seemed to have no detrimental effect on their subsequent progress.

Many interesting laboratory findings incident to blood transfusions appear in medical literature from time to time. Salant and Wise in 1917 reported sodium citrate as having been entirely thrown out of the blood stream within ten minutes after its introduction. Competent observers have variously determined the span of life of the introduced blood cells in their new location as being from ten to 113 days. The relative value of the actual increase of oxygen carriers and the hematopoietic stimulus of blood-building functions presents many potential phases, which, with refinement in methods, may

mean much wider application of this procedure in the future.

Our experiences have indicated some suggestions and conclusions. The contraindications to the use of transfusion of blood in tuberculosis include pulmonary edema, advanced nephritis, and myocarditis, but in the complicating factor of nephritis, which is not of long standing, small transfusions may be of decided value. The possibility of there being a distinctive value in the blood of a cured tuberculous patient has been considered, and a record of a Von Pirquet reaction of donors would be of interest in this connection. I wonder whether it is the part of wisdom to confine this valuable procedure to third stage cases alone? If it had not been for the prohibitive cost to our patients we would have repeated the transfusions, for we believe this to be indicated. The patient having had one satisfactory boost, why should we not repeat it at carefully selected intervals? However, since anaphylactic reactions are reported in such repetitions, it is probable that the donor should be changed for each transfusion.

In the battle with the Koch bacillus there are times when the forces of resistance in the unfortunate victim seem only able to prevent advancement of the enemy. At just such critical periods, we have frequently observed that the arrival of the reinforcements of transfusion has resulted in victory instead of defeat.

In conclusion, may I repeat. Transfusion in pulmonary tuberculosis is neither a panacea nor a specific. But it is not a nostrum. We have no delusions that it will cure baldness or balance the national budget. But it is a procedure deserving greater and more intelligent use.

THE TUBERCULOUS PATIENT

probably not more than five to ten per cent of patients were given this added advantage, but today in some institutions fully 80 per cent are selected for some form of compression. Phrenicectomy, artificial pneumothorax and thoracoplasty

(Continued from page 9)

play an important part in treatment, and the physician who fails to recognize this is criminally negligent and is not giving to his patient the best that medicine and surgery have to offer in the treatment of tuberculosis.

ABSTRACTS



This department is devoted to abstracts of articles carefully and judiciously selected by the Editorial Staff

McCLENAHAN, W U, and PAUL, J R A
Review of the Pleural and Pulmonary Lesions
in Twenty-Eight Fatal Cases of Active Rheu-
matic Fever Arch Path. 8 595

The material in this study is based on 28 fatal cases of acute rheumatic fever showing signs of activity in the myocardium or endocardium. Active pericarditis was present at autopsy in 75 per cent and active pleurisy in 64 per cent of the cases. Pleurisy apparently is a specific manifestation of the rheumatic infection and is characterized by the nonsuppurative character of the exudate and absence of bacteria. This lesion resembles the rheumatic pericarditis. It is, as a rule, less extensive than pericarditis and associated with far less serious consequences. It manifests itself in a number of different forms but is generally accompanied by the accumulation of pleural fluid which may be hemorrhagic, particularly in young children, and is nearly always rich in fibrin. It bears a close resemblance to tuberculous lesions of the pleura but differs from this last infection in that it does not reveal a thickened hyalinized pleura as an end-stage.

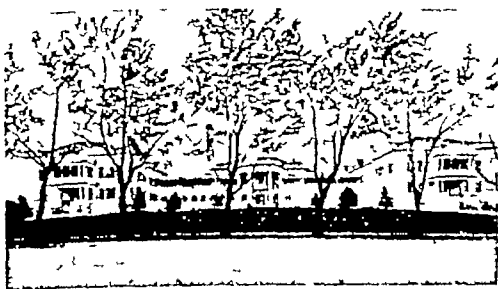
There was noted also a definite tendency for the pleurisy to involve the neighboring area of the lungs producing a subpleural pneumonitis.

The authors have also studied the lesions that occur in and about the pulmonary vessels and have found in these patients that there are many arterial changes. They have noted particularly in the cases occurring in childhood the presence of focal or hemorrhagic lobular pneumonia exhibiting certain atypical features. These features differ from ordinary terminal lobular pneumonia. While not specific manifestations of rheumatic fever, these lesions seem to occur fairly commonly in the disease.

CECCHINI, A. La bacillaemia nella tubercolosi.
Riv di Patol e Clin della Tubercolosi, 1, 267

According to Loewenstein (1925) the frequency of bacillaemia in the three stages of tuberculosis according to the Turban-Gehardt classification is as follows: first stage, 2 per cent; second stage, 5 per cent; third stage, 30 per cent. Rosenbeig, using a special method which consisted mainly in collecting the blood in a solution of sodium citrate, obtained positive results in 100 per cent of 50 cases of pulmonary tuberculosis, some of which were in the initial stage. Kurashige who examined the blood in 155 cases of pulmonary tuberculosis in various stages of the disease by the Staubli-Schütter method found a considerable bacillaemia (30 bacilli per field) in every case. He also examined the blood of 34 apparently healthy persons and found bacilli in 20. Of these 20 individuals 3 developed tuberculous pleurisy in the course of eight months, 2 had hemoptysis, and 4 of the rest produced positive results when their blood was inoculated into guinea-pigs. Kurashige, therefore, concluded that tuberculosis is a generalized infection from the first, even if it cannot be defined as a primary bacillaemia with secondary localizations in the organs. According to Kurashige the presence of tubercle bacilli in the blood is of great diagnostic value, but has no prognostic significance, as no relation can be shown to exist between the amount of bacillaemia and the course of the disease. On the other hand, there are numerous writers who maintain that bacillaemia is very rare in tuberculosis, except in the generalized milary forms.

Cecchini comes to the conclusion that bacillaemia occurs more frequently in human tuberculosis than is supposed, and may account for some of the symptoms.



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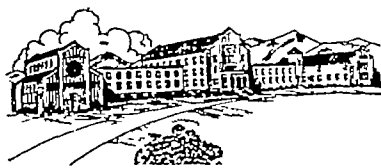
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BLAKE, Francis G. Observations on Pneumococcus Type I I I Pneumonia. *Annals of Int Med* Vol 5, No 6

A consecutive series of 122 cases of pneumococcus type I I I pneumonia admitted to the New Haven Hospital during a ten year period is reviewed. Confirmatory of previous reports, it has been found that the incidence is greatest in the later decades of life, approximately 50% of the cases being over 55 years. Males were nearly twice as numerous as females. There was no special racial susceptibility found. The monthly incidence corresponded to that of pneumonia in general.

Acute predisposing causes played a very important part in the etiology of the disease, being of undoubted significance in 75% of the cases. The most frequent predisposing causes were the acute respiratory infections—common colds, grippe, and influenza. These immediately preceded the onset of the pneumonia in 52% of the patients. Exposure, exhaustion, and acute alcoholism were recorded in 17%. Chronic disease existed in 66% of the patients and in all probability exerted a significant influence on susceptibility.

The onset, the clinical course and the symptomatology of the disease were similar to those of other forms of pneumococcal pneumonia. In young adult life in otherwise healthy individuals the disease ran a mild course with early critical recovery. In the later decades the disease ran a more prolonged course and recovery by crisis was the exception. Empyema occurred 6 times, pericarditis twice, endocarditis once, otitis media occurred 5 times in children. In spite of the high mortality, bacteremia was found in only 18.1% of 116 cases, in only 37% of the fatal cases.

Although the total mortality in this series was high, 44.3%, it is shown that this was largely determined by the factor of late age incidence and by the prevalence of chronic disease at all ages in those who succumbed. In 40 cases, not subject to chronic disease and irrespective of age, the mortality was only 15%, while in 79 patients suffering from chronic disease

(including 2 with pregnancy) the mortality was 56.9%.

It may be concluded that pneumococcus type I I I pneumonia is a highly fatal specific infectious disease due, in general, not to a highly virulent organism that attacks and kills a healthy host, but rather to a debilitated, sickly or senescent host who succumbs to what is a relatively mild and uncommon infection in the young and vigorous.

PATON, R. T. The Clinical Significance of Choroidal Tubercles. *Annals of Int Med* Vol 5, No 8, p 997

Choroidal tubercles seen by the ophthalmoscope are of two types commonly known as (1) the granuloma or solitary tubercle, (2) choroidal miliary tubercles. The former is usually associated with chronic tuberculosis and the latter with acute miliary tuberculosis.

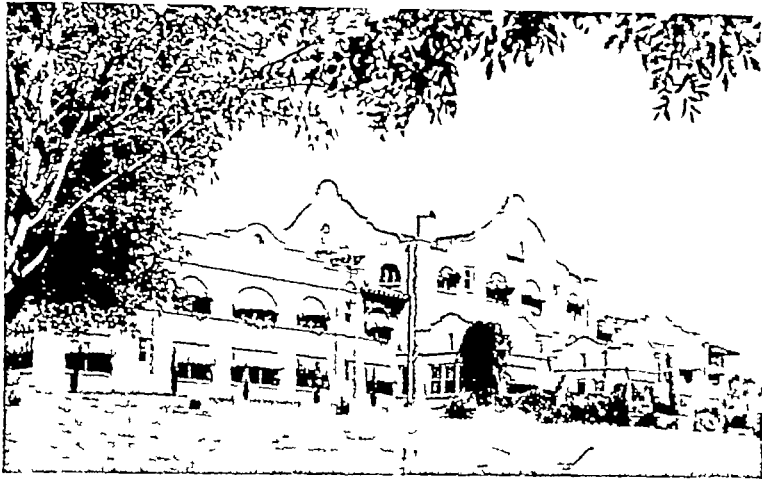
The granuloma or solitary conglomerate tubercle is a rare and destructive disease and is usually unilateral. It is probably always secondary to tuberculous disease in other parts of the body and is usually seen in the early years of life. It must be differentiated from malignancy, glioma, retino blastoma, etc. Enucleation should not be done until tuberculin treatment has proved unsuccessful.

Miliary tubercles of the choroid are frequent in miliary tuberculosis especially in the late stages. Various workers have reported incidence of from 20% to 80% involvement of the choroid in miliary tuberculosis. The percentages are much higher in tuberculous meningitis. Repeated examination is necessary since tubercles develop rapidly in the late stages.

The presence of miliary tubercles of the choroid is often a valuable aid before the laboratory tests have been completed, in making a diagnosis in cases suspected of being typhoid fever, meningitis, or miliary tuberculosis. The prognosis, of course, is grave.

HAYES, E. W. The Prognosis in Tuberculosis with Especial Reference to the Psychological Aspects. *Annals of Int Med* Vol 4, No 9, p 1183

The prognosis in tuberculosis is, at best, uncertain because it depends upon so many different factors, such as age,



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sex, habits, and opportunity to take the cure, which are more or less fixed, while others, such as the virulency of the infecting bacilli and the resistance of the one infected, not only differ in each case of pulmonary tuberculosis, but are changeable and are greatly modified by the way in which the patient adjusts himself to the cure and by the way he reacts to the cure. At the beginning of each case we can conceive of a certain virulency of the infecting bacilli and a certain resistance of the host prepared to wage a battle.

We cure tuberculosis by raising the resistance of the body against the inroads of the tubercle bacilli. The most important factor in raising this resistance is rest, and by rest we mean not only physical rest, but emotional and mental relaxation. A large percent of the factors influencing prognosis are psychological and have to do with the emotional, mental, and nervous reactions of the patient. We must realize that we are not dealing with normal individuals, but with people who, for the most part, are not only physically, but mentally and nervously sick. If we, as physicians, are to do our duty in aiding these patients to recover their health, we must study them and understand them individually and supervise them so that we can control these psychological factors, not only at the beginning of their illness but throughout its course, be it months or years.

Our first step from a psychological consideration, which makes for a favorable prognosis, is to truthfully explain to the patient the extent of his disease, as well as the nature and purpose of the cure. It is the uncertainties of life, whether they have to do with health or other serious matters, that cause worry, restlessness, and emotional disturbance, and a simple, but frank, explanation of the facts goes a long way toward establishing that bond of confidence which should exist between a patient and his physician.

Our second consideration is proper en-

vironment and this is particularly true of patients with tuberculosis because of the nature of the life they must lead, and because of the unstable condition of their centers of control. Consequently, tuberculous patients are better able to carry out the necessary details which make for a favorable prognosis when they are so placed that they have the moral support and mutual sympathy of those around them, and when they are under the continuous care and supervision of those who understand and appreciate their mental and nervous disturbances.

In tuberculosis there is no factor more important in the prognosis than time. Many patients who would otherwise recover lose their lives because they do not stick to the cure long enough. With few exceptions, patients who give up the cure too soon do so because we have not installed into them the right prospectus of tuberculosis and the essentials of a cure. That is, we have failed to influence their trend of mind so as to hold them on the cure, consequently, our ability to properly advise, to intelligently guide and to efficiently manage our patient is the outstanding influence in bringing about a favorable outcome in pulmonary tuberculosis.

ADAMS, LEYLAND J. Tuberculosis of the Aorta. *Arch Int Med* 44: 711

The case reported here is one of 33 to be found in the literature where tuberculous lesions have been found in the aorta. The present case is the twentieth instance of tuberculosis reaching the aorta by extension from a tuberculous process outside the aorta. In this case, the autopsy showed that the involvement extended to the media but that no rupture had occurred. The lesion had extended from an acute tuberculous involvement of the left pleura.

Clinically, syphilitic aortitis was suspected on account of the history, shortness of breath, pain, pallor and the positive Wassermann reaction.



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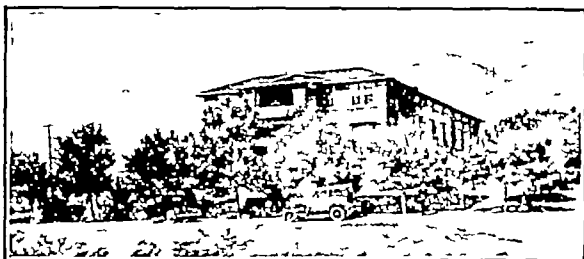
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COOPER, GEORGE F. Post-Pneumonic Lung Abscess Resembling Lung Tumor. *Annals of Int Medicine*, Vol 5, No 10, p 1308

It is difficult to differentiate an unresolved pneumonia from an encapsulated empyema in which the retained fluid is under pressure. It is also difficult, at times, to differentiate either of the two conditions mentioned above from a lung tumor. It is usually necessary to take into consideration not only the physical findings and X-ray examination, but the history of onset before an absolute diagnosis can be made.

Middle lobe pneumonia, without involvement of the remainder of the lung, is a rare condition, and may terminate in various ways. It may resolve and clear up in a very short time, or it may go on to supperation and gangrene. The condition may also break down into abscess formation and this collection of pus be later evacuated into a bronchus and drained.

Cooper reports an unusual case which was variously diagnosed as malignancy, encapsulated empyema, lung abscess, and finally resolving pneumonia. The patient was a white male, age 33, whose chief complaint was severe pain of the right chest of such intensity that he walked in a stooped position. The pain had been present in various degrees for three months, accompanied by a continuous fever with night sweats and early morning cough. Breath sounds were absent and percussion note was dull over the lower half of the right chest. X-ray revealed a dense shadow resembling that of a lung tumor.

The night after admission the patient was seized with a violent coughing spell which evacuated large quantities of odorless, greenish, purulent pus. The temperature dropped immediately to normal, and the patient continued to raise pus for about one month when he was considered entirely recovered. There were no tubercle bacilli in the sputum at any time. Guinea pig inoculation was also negative.

RIZER, ROBT I. Syphilis of the Lung. *Annals of Int Medicine*, Vol 3, No 5 p 452

In the medical literature there are probably between two and three hundred au-

thentic cases of pulmonary syphilis. This is interesting in view of the fact that about three percent of the entire adult population is syphilitic. There were 12 cases of lung syphilis in 2800 autopsies at John Hopkins Hospital, 12 in 4,480 autopsies in New York, and 29 in 5,456 autopsies in California. Syphilitic lesions of the lung are never early manifestations of the disease—appearing only in the advanced tertiary stage.

The pathology of pulmonary syphilis is similar to that of pulmonary tuberculosis. The acute and chronic types of the disease are found. The acute form with sudden onset of fever, cough with or without expectoration, dyspnea, weakness, and sweats is rare. In the chronic form miliary gummata occur, increase in size and number until consolidation exists. Organization may occur with formation of an abscess, cavity formation, gangrene, or fatal hemorrhage. More frequently there is regeneration of connective tissue especially about the bronchi and vessels. Such chronic form with a slow insidious onset, resembling a chronic tuberculosis in course, having little fever, weakness, loss of weight, cachexia, and dyspnea out of proportion to the physical findings is the type usually met with in medical practice.

X-rays usually show a unilateral infiltration involving the middle and lower lobes, beginning near the hilus and extending peripherally. The Wassermann is positive in about 50% of the cases. Spirochetes are not demonstrable in the sputum.

The usual vigorous anti-luetic treatment should be used. Prognosis of the lung condition is good unless the syphilis of some other part (aneurism, etc.) is too far advanced.

The author presents a case in a white single woman, aged 45, with chronic lung symptoms of several years duration. Wassermann was positive. X-ray showed a dense infiltration involving the right middle and lower lobes which was completely cleared with one year's intensive anti-luetic treatment.

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QUERIES AND ANSWERS



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EDITORIAL
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Q Upon what does the incidence of childhood tuberculosis depend?

A It depends largely on the amount of exposure to open, adult cases, that is to the amount of adult diseases in the community. Hence it is much more common in cities, in the crowded slums and now is becoming very common in certain rural districts because of crowding.

Q How important is a positive skin reaction in a child?

A. It is very important — however, there is a wide spread impression among physicians that the tuberculin skin reaction is of little significance, and that practically all children after infancy are infected and give a positive reaction. This is far from the truth. The tuberculin skin reaction gives us very definite information as to whether a given child has been infected or not. It must be remembered that a positive tuberculin skin reaction does not tell whether the disease is active or not, but merely that the individual has been infected at some past time. The diagnosis of activity must be made by the symptoms and X ray examination.

Q What are some of the characteristic clinical signs of childhood tuberculosis?

A Fever is almost a constant sign of activity. Failure to gain weight at the proper rate, languor, anorexia and irritability. Increased growth of hair on the nape of the neck and arms, also long eyelashes. Phlyctenules on the cornea are nearly always due to the toxemias of tuberculosis, photophobia may be the first suspicious signs. Tubercles are significant. These occur on the trunk and accessory surfaces for the extremities, they are small raised lesions with a depressed center and they are mistaken for chicken pox at times. They usually occur in crops at long intervals.

Q What percent of children with positive skin reactions are also positive by x ray?

A It is estimated that only 20%. It must be remembered, however, that we must not depend upon the x ray alone in picking out active cases. The best procedure is as follows:

First give the child a skin test and, if positive, seek for signs of activity, regardless of x ray findings.

Q Is pneumothorax used extensively in the treatment of children with pulmonary tuberculosis?

A No. It is much less useful in children than in adults.

Q Upon what does a prognosis of tuberculosis in children depend?

A The resistance of the child, his race, economic status and method of treatment.

Q Are the numerous substitutes such as tablets and concentrates of cod liver oil valuable?

A None of them can replace pure cod liver oil, some of them may do harm from large amounts of vitamin D contained. There is no evidence that it is desirable to give enormous amounts of this substance. The same warning holds good against the over use of the ultra violet ray.

Q Should a child be forced to eat?

A No. Food should not be forced, and the child should not be coaxed, amused or bribed to eat. A meal should be put before him and nothing said about it. In half an hour it should be taken away and nothing given until the next feeding, no matter what has been left. In a few days he will eat willingly.

Q Do cavities ever heal without the use of some surgical compression?

A Yes, recovery from cavities is constantly taking place, although it may take place in some cavities, while others, in the same lung, may become larger.

Q Is it true that in every person with a positive sputum that there is a cavity existing in the lung?

A Yes, technically, this is true though the cavity may be microscopic in size, and of course, not demonstrable by either clinical or X ray examination.

Case Report

By Dr. R. B. Homan

D. J. B., St. Paul, Minnesota.

Male Age 42

Family and personal history irrelevant.

In December 1933 began coughing, had some pain in the upper part of the left side of the chest, found that we was having a slight rise in temperature especially in the afternoons. Felt rather badly all of the time. In about ten days from the onset of the symptoms began coughing and expectorating bloody sputum—never in large quantities but it kept up rather regularly each day. At the appearance of this bloody sputum he consulted his physician, who made a diagnosis of tuberculosis and advised that the patient enter our institution.

Early in February we were consulted. Physical examination revealed an area in the upper part of the left lung exhibiting moist rales and other evidence of some pathology in the lung. Roentgenograms showed an area of marked infiltration lying underneath the third and fourth ribs, with a small area of caseation in the center. Repeated examinations of the sputum were made but tubercle bacilli were never found. On two occasions, however, the laboratory technician found a few small granules or grains such as are present in the sputum in actinomycosis. We did not consider this sufficient evidence so a culture was made and a growth of actinomyces resulted.

Treatment consisted in the administration of rather large doses of Sodium Iodide, as a result of which the disease cleared up entirely after a few weeks. Two important facts are impressed by this case.

1. One must not be too hasty in making a diagnosis of tuberculosis because the patient is expectorating pus and blood following cough—even though there may be pain in the chest, afternoon fever, and other familiar signs and symptoms of that disease.

2. It is not an easy matter to find positive evidence of actinomycosis in the lung by microscopic examinations of the sputum, therefore cultures should always be made where there is any doubt.

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What OTHERS say.

The Editorial Staff and Business Management of this new publication deserve great credit for the splendid accomplishment represented by the initial number of this publication. I know those of us up at Loomis who have had an opportunity to see the magazine are greatly impressed with its makeup and attractiveness and I wish long life and prosperity to this newcomer in the field of medical publications.

GEORGE FOSTER HERBEN, M. D.
Loomis, N. Y.

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H. A. PUTNAM, M. D.
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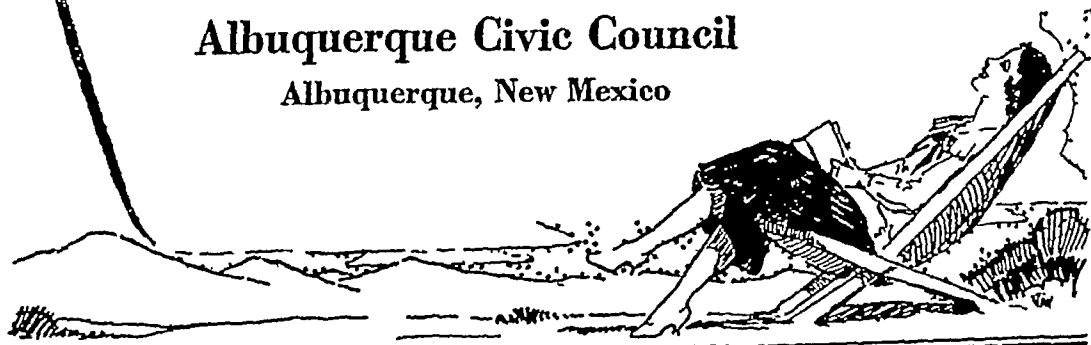
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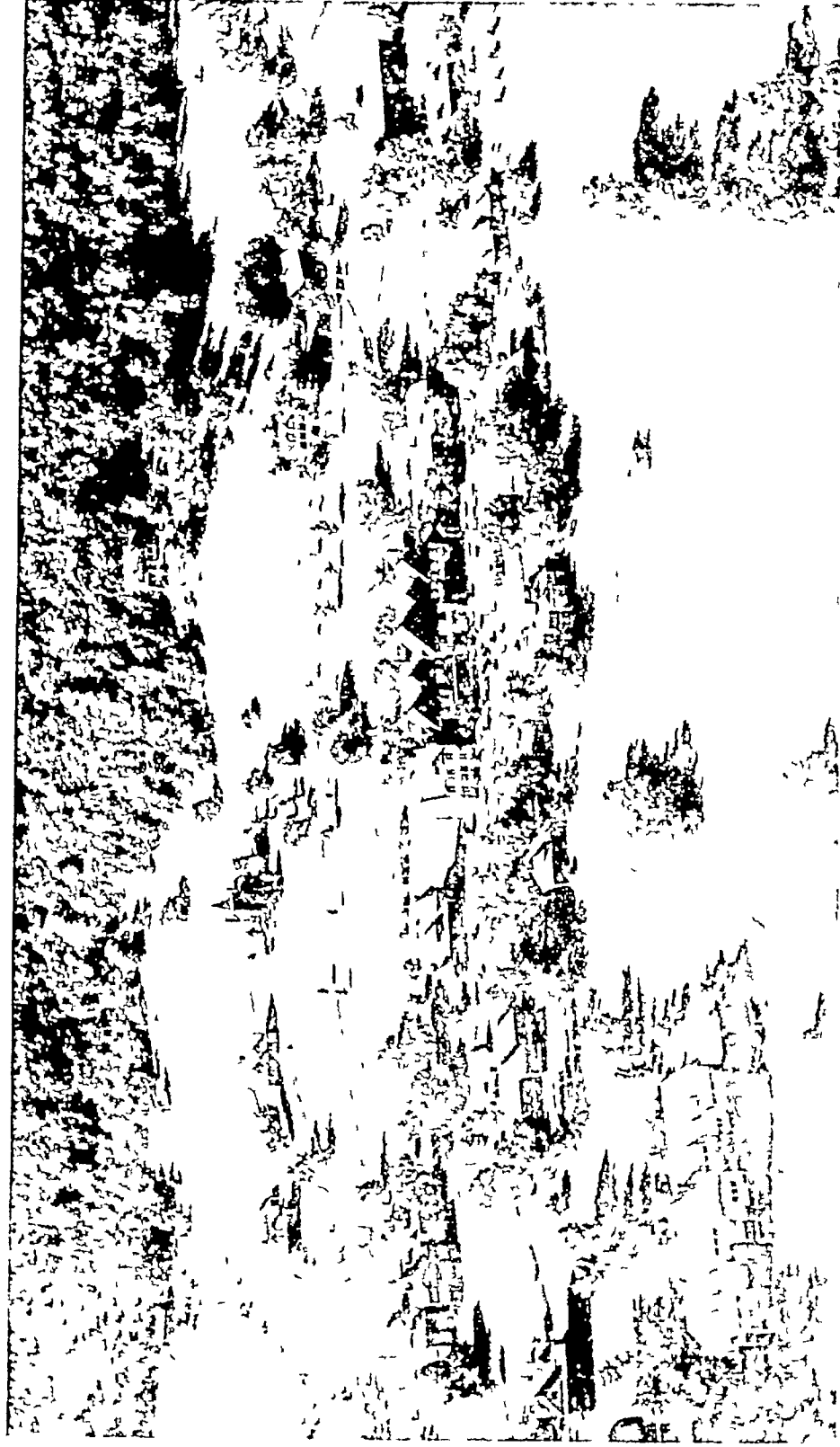
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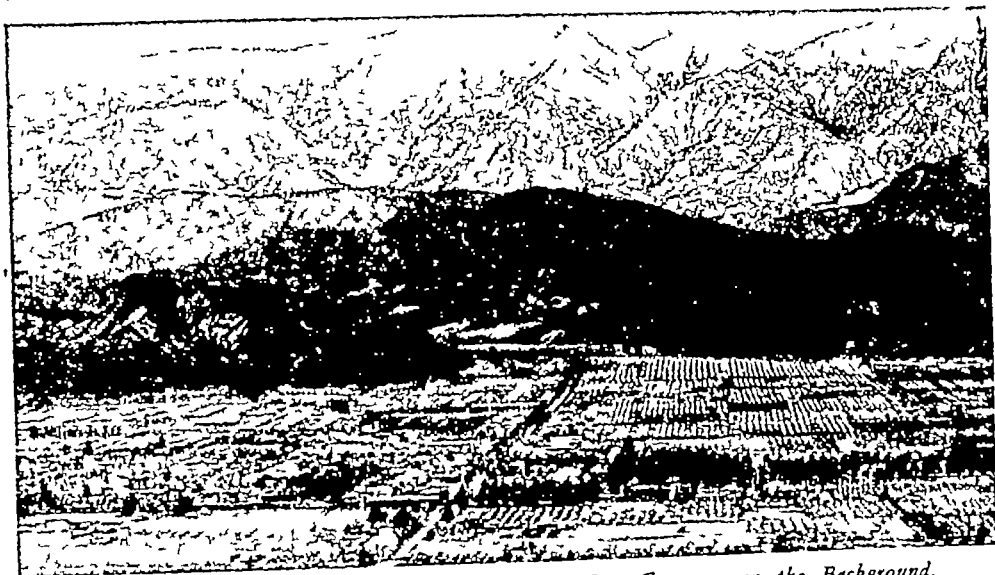
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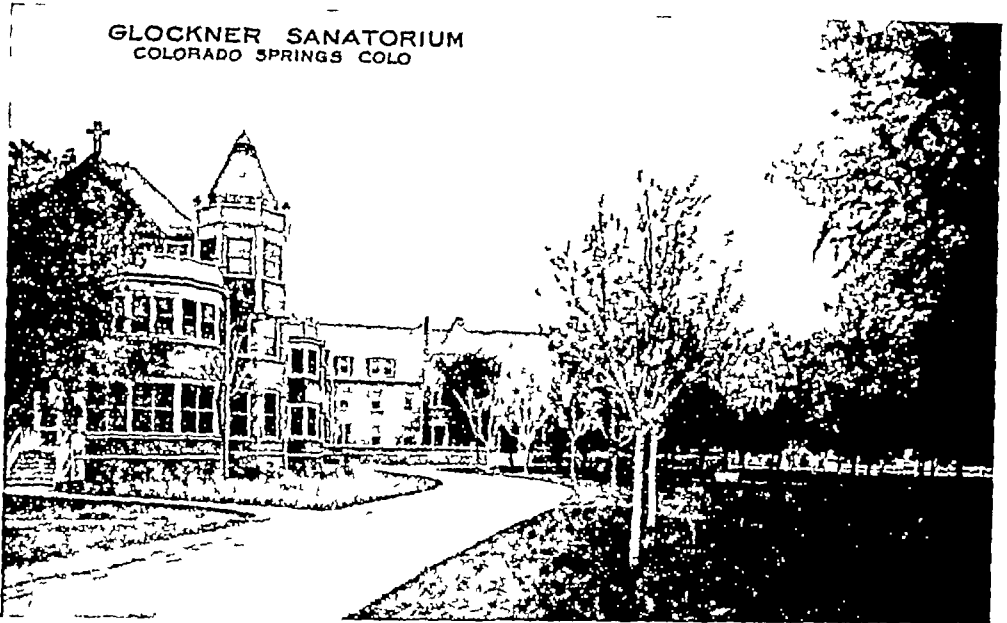
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C M HENDRICKS EDITOR IN CHIEF

(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"
 Lawrason Brown, M D

Editorial Comment

Tuberculosis and Quackery PHYSICIANS ARE prone to be criticized by the laity for their slowness in taking up a new cure that is offered for almost any disease. It is well that the profession does not eagerly respond to every so-called sovereign remedy, for the disappointments that follow in their train are numerous, and the cases of many who have tried such remedies and in whom they have failed are heart-breaking and tragic. Tuberculosis is no exception to this rule. Both in the lay press and by word of mouth one hears of all sorts of schemes that are vaunted as being effective in securing recovery from this disease—the application of high degrees of heat, various lights (and, alas, some shadows), foods, drugs, one after another, are paraded before a credulous public and an equally incredulous medical profession.

The great trouble with all these specifics in tuberculosis lies in the fact that they disregard the tripod upon which experience in the management of the disease is based, namely, rest, fresh air and good food. To these three, which have withstood the test of time, must now be added the proper employment of pulmonary surgery in the wisely selected case. The three fundamentals above mentioned still stand unassailed by all who have a wide experience in the treatment of tuberculosis. Anything else other than pulmonary surgery must be considered in the nature of an adjunct by no means to take the place of the corner-stone of treatment.

Quackery and charlatanism thrive on advertising and the making of spurious claims to sick, frightened and anxious patients and relatives. The medical profession, standing firmly on the rock of knowledge and yet possessing the wisdom of the inquiring mind, refuses to be stampeded by any unworthy assertions, and, therefore, must withhold its sanction to the employment of any new method until by unquestionable experiment and clinical data it has been found that the remedy is actually of worth. When this comes about (as witness the case of insulin), the medical profession is the first to welcome with open arms any addition to its therapeutic armamentarium. P H R

Depression Deaths DURING THE depression we have been told through the daily press and current magazine articles that the health of the Nation had improved. However, this has been far from the truth. We are now reliably informed by the Asst Secretary of the Treasury Roche, in charge of the United States Public Health Service, that a survey covering a period of 1929 to 1933 shows that the mortality in families of un-employed and part time workers increased 20%. The sickness rate for the same group had increased 50%.

Apart from the human suffering and injustice involved in these figures, the economic waste and financial loss to the Nation is incalculable. In former editorial comments it has been pointed out that at

no time in the past decade has tuberculosis assumed a more menacing aspect. Now comes the above official figures pointing out that the sickness rate in a special group has been increased 50%. Future surveys will undoubtedly reveal a large increase in the incidence of tuberculosis.

There are many well-fed citizens and members of congress who object to the proposed public health appropriation of eight million dollars in the President's Social Security bill which is being held up in the senate committee. We agree with Secretary Roche who commented "Probably the day will come when the Federal Government will invest in public health not eight million, but one hundred and twenty million or \$1 00 per person."

Spectacular disasters such as earthquakes, sea tragedies and war which bring sudden death, really shock the public, but the slow insidious horror of disaster which carries slow death for even larger numbers of victims is beyond average comprehension. It has taken us five years to discover the ravages of hunger and what is happening to the health of under-nourished and poorly-housed Americans. We will study with great interest the next official report from the United States Public Health Service. C M H

Mental Attitude GREAT CATASTROPHES are known to have a marked influence on the incidence of disease. War, pestilence, famine and financial depressions, leave their deleterious effects on the physical body as well as the body politic.

The financial condition of the present period has made itself felt by every tuberculous individual as well as those who are especially interested in the control and treatment of the disease.

The lowered standards of living have contributed to bodily weakness and physical disturbance. Mental conflict, anxiety, and neurasthenic states add greatly to the lowering of resistance upon which prophylaxis and treatment of tuberculosis so depend.

It is reasonable to anticipate that the psychic and somatic depression brought about by the untoward financial state of the past few years, will result in a large increase in the incidence of tuberculosis and will serve to aggravate open cases and tend to open closed cases, who were doing well under less adverse circumstances.

Mental attitude is a salient principal in the treatment of any disease, especially in the treatment of tuberculosis. Anxiety over finance, social relations, home disruption and gloomy future prospects, all contribute to the disturbance of metabolism, interfere with rest and contribute to somatic and autonomic nerve dysfunction. To meet these conditions, to study and analyze them, will be added problems for those of us who are interested in the control and treatment of pulmonary tuberculosis. C M H

Time as a Factor in Tuberculosis FREQUENTLY we are confronted with the statement from patients who are beginning the fight against tuberculosis that they have been assured by some physician that they could overcome the trouble in a few weeks. This is a rather dangerous assurance to give, since it often encourages the patient to undertake to carry out a regime which imposes a financial obligation that he can assume for a short time, but could not continue over a long period. Then, too, when he discovers, as in time he must, that to reach his goal will require more time than he anticipated, his confidence in the ability or veracity of his physician is shaken.

There are several factors which are responsible for the time required in the treatment of tuberculosis. In the first place the disease has been present and making pathological changes in the lung tissue, in most instances, for a much longer period of time than we think. In other words, the disease has already become chronic before the patient consults his physician. Tuberculosis is often very insidious in its onset, and in most cases care-

ful questioning will reveal the fact that the patient has not really felt well for two or three years prior to his first visit to the doctor

The toxemia has already affected other vital parts of the body, and, necessarily, much time will be required for building up the resistive forces sufficiently to repair the damage already done. The tubercle bacillus is very resistant because of its protective waxy capsule and its manner of growth in the tissues. No remedial agent has yet been found which will quickly destroy the organism in situ, therefore we must depend upon methods of treatment, the results of which come slowly

Then, too, we should not forget that the matter of individual resistance to tuberculosis has a very wide range of variation. One cannot estimate with any degree of accuracy the amount of natural resistance which may be possessed by any individual, therefore, one who apparently has but a small lesion when the diagnosis is made may, because of an individual low resistance, require several years to secure an arrestment of the disease

Necessarily, the element of time is influenced by the attitude which the patient assumes when the nature of his trouble is made known to him, the zeal and earnestness with which he tackles the job, and the degree to which he co-operates with those who are directing the fight

At least we may suggest that the physician should think very carefully before venturing an opinion as to how long it will take the patient to get well R B H

Tuberculosis Among Infants IT HAS long been an accepted fact that advanced tuberculosis, military, meningeal, or pulmonary, among infants, has, with few exceptions, a fatal termination, hence the idea has also arisen in the minds of many that the infant's resistance to tuberculous infection is practically nil. Within recent years, however, with the more routine use of tuberculin skin tests and with more frequent X-ray examinations of the chest, opportunities have been provided to study

the infection and disease among infants in its early stages. The results of such studies indicate that many infants develop a high resistance to their infection, and that not a few recover from the more chronic, and some even from the advanced forms of the disease

Spontaneous Pneumothorax SPONTANEOUS PNEUMOTHORAX has been divided into two groups

- (1) A group including the typical cases of chronic pneumothorax, hydro-pneumothorax and pyo-pneumothorax in tuberculous patients, mostly of a bad prognosis
- (2) A group including most of the cases of so-called "idiopathic" pneumothorax in apparently healthy persons, arising spontaneously and in connection with some—often very slight—muscular effort, such as lifting a weight, swinging a golf club, running, laughing, coughing or sneezing

The abnormal physical signs generally disappear within four or five weeks without special treatment. It is believed that the most probable explanation of these cases, is that at some time or other a slight tuberculous bacillaemia (perhaps regarded at the time as an attack of influenza or "febrile pulmonary catarrh"), resulted in the formation of a certain number of sub-pleural tubercles. One of these tubercles led to a local pleural adhesion, and afterward to a superficial emphysemabulla, adherent to the parietal pleura, as time went on the wall of the bulla gradually became thinner, and finally ruptured spontaneously, thus leading to the occurrence of "idiopathic pneumothorax" in an apparently healthy person

In group 1 it is not to be expected that a spontaneous pneumothorax would be of much benefit to an individual

In group 2 it should be remembered that the spontaneous pneumothorax hardly ever leads to more than a temporary inconvenience and as the patient is usually otherwise in good health, there could possibly be no good resulting in a spontaneous pneumothorax C M H

Supervised Graduated Exercise in the Treatment of Pulmonary Tuberculosis

EXERCISE HAS no place in the treatment of a patient suffering from an active tuberculous lesion regardless of its location. Rest, absolute rest, the nearest approach to immobilization, is the only part of the program that has stood the test down to this day. Every improved method is based on the idea of rest. Pneumothorax, removing the phrenic nerve, thoracoplasty are all based on rest. There is probably no disagreement here among those who know most about this disease and its treatment.

The purpose of complete rest is to heal the patient's disease—not to maintain or promote his physical capacity and ability. Exercise during the active stages of tuberculosis has probably killed millions. It is equally consistent to say that rest has never hurt a patient's lesion.

But after the disease is healed, supervised, graduated exercise is the only safe way to restore the patient's capacity and fit him for the duties and demands of a normal active life.

The beginning of exercise may be considered and is the danger period in the treatment of tuberculosis. This is when recurrence, at times uncontrollable, usually happens. No tuberculous patient can stay in bed six months, a year or longer and be safely ready for a day's work when he leaves the bed. To try it would be disastrous. If a patient can not afford sanatorium supervision during both the rest and the exercise periods, it would be infinitely safer to forego supervision during the bed rest period and have it for the exercise program. If he gets hurt anywhere along the line, it will be most likely after his rest is finished and his exercise begins. This is why those who treat tuberculosis fear recurrence. The patient is fat, he looks well, he is symptom free—clinically well. For further supervision, he sees no need and has no desire, and here tragedies usually enter

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But you say why do we not teach the vital importance of all this? We do. Just remember our first forefathers ate the forbidden fruit and that when God Almighty Himself was their teacher.

It therefore follows that the only safe course for him who has an apparently healed lesion is supervised, graduated exercise directed by a physician experienced in this kind of work. The safe and beneficial dose of exercise must be understood. A dose too small is worthless. An overdose may prove disastrous. The results on both the patient and his lesion must be closely watched and accurately assessed.

As a rule, the first and safest exercise, when the patient's condition permits, is reading. He may begin with thirty minutes in the morning. If this does no harm and produces no symptoms, thirty minutes in the late afternoon may be permitted. These morning and evening periods may be increased every few days as conditions warrant. Limited writing may now be permissible. After the patient is reading two or two and a half hours each day, he may sit up in his room for his breakfast—usually for an hour. After a satisfactory week of this, he may sit up an hour for the evening meal and in a few days the noon meal. After this, the morning time may be increased thirty minutes each week until the patient is up from after breakfast to ten o'clock and from five until eight-thirty p m.

It should now be safe to try some other form of exercise—preferably walking fifteen minutes morning and late afternoon. This may be increased each week at the same ratio. The pulse and temperature should be taken immediately after exercise and again in thirty minutes. If any fever or high pulse registered immediately after exercise disappears in thirty minutes, it may be considered negligible. Gen-

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How Not to Treat Tuberculosis

THE SUBJECT assigned to me is Some remarks on how *not* to treat pulmonary tuberculosis

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Had Dr Howson been able to be on the program as was originally intended, his statements might have been considered as official and as representing the opinion of the Tuberculosis Service of which he is the Chief. I, being simply a member of the Attending Staff, free, white and considerably over twice twenty-one, am simply stating my personal opinions and observations of some twenty years of more or less close contact with tuberculosis at Bellevue, The Metropolitan Life Insurance Company, army tuberculosis hospitals, private practice and this institution

In attempting to generalize when speaking of the care and management, or mismanagement, of tuberculous patients, when individualization is a prime factor in their care, I realize I am laying myself open to criticism, at the very start. I also realize that some of the methods or practices I am going to object to, are correct and proper in certain specific instances, and in certain selected cases, but I consider them to be the exception that proves the rule.

The first problem in how not to treat pulmonary tuberculosis is naturally a question of diagnosis. It is true the diagnosis is often not easy except in far advanced cases, and in these we all have missed, and will continue to miss, large cavities. However, there is no excuse for such a large percentage of cases being far advanced with little or no chance of recovery before they are diagnosed or seen by men doing chest work, both in private practice and in hospitals. Many doctors apparently take the attitude that once they are through medical school and internship, the taking of a careful history

is a waste of time. Others think because they found the lungs negative, or nearly so, on their physical ex-

amination, that the patient cannot have pulmonary tuberculosis even though the history may be suggestive. Few physicians, other than those primarily interested in chest work, have a patient exhale and cough during auscultation, and yet the examining physician who does not have the patient do this, does not know how to examine a chest for tuberculosis. The fact that one or two sputum examinations are negative for acid fast organisms does not rule out tuberculosis. A borderline or even a negative X-ray film does not mean that there may not be a clinical or active pulmonary tuberculosis. On the other hand, dullness to percussion or rales on auscultation over some portion of the lung does not justify a diagnosis of tuberculosis, without further study. The same is true of blood-streaked sputum, or even frank hemoptysis, or certain suggestive shadows in an X-ray film. Other than a positive sputum there is no short or easy road to a diagnosis of pulmonary tuberculosis. On the part of the general medical man there is a woeful lack of early and accurate diagnosis of pulmonary conditions. It is only natural that the chest man holds in rather low esteem the ability of his confreres to accurately diagnose pulmonary tuberculosis, at the stage when a cure may be expected. In a large percentage of cases, months or years later, we see their mistakes which they never know about. I realize that our batting average is equally low as regards surgery, gynecology, dermatology, cardiology or gastro-enterology, but we do not attempt to pass judgment on those cases.

When it comes to treatment there is little doubt but that patients are best handled in a sanatorium. This is particularly true of indigents or inmates of charitable or welfare institutions. In such places the doctors are not bothered by nor

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swayed by the glib, silver-tongued orators who represent the big drug and supply houses, and whose "electrical transcription" is almost perfect, and whose knowledge of medicine and therapeutics is astounding. The professional call on the patient does not have to be justified by ordering a dose of this, or the giving of an injection of this or that vaccine, serum, antigen or stimulant, or the prescribing of a certain number of minutes exposure to this or that ray. The private patient cared for at home so often takes the attitude that because he is paying the doctor for his visit he has the right to demand certain treatments or medication, or of deciding that the treatment, suggested and advised by the physician, is not best for him. It is all too true that often the care and treatment of patients becomes a racket for the enrichment of the doctor and the pharmaceutical house. The excuse given is that the patient must be seen regularly and kept under control, and in order to justify the call in the eyes of the patient, something must be done and given, other than intelligent examination, careful management, honest and sound advice and hope and confidence. Such an attitude is an insult to the intelligence of a patient who has been properly instructed and advised about pulmonary tuberculosis, and reflects back on the doctor's ability to so instruct and advise. Just recently I met a physician who told me it had been necessary for him to take over the practice of a friend for a few weeks. I am acquainted with the doctor who was going away. He is not on the staff of this hospital but is perfectly eligible to be by virtue of his experience, training and professional standing. Just before leaving he saw a new patient and made a diagnosis of pulmonary tuberculosis. He instructed the doctor taking over his practice to see this patient every day for two weeks, and to give his daily injections of some gland hormone which would extract the calcium from his bones and increase his blood calcium. My reaction to this statement was a remark that sounded biblical, but was not so intended. In a

somewhat surprised tone the doctor said "Why, isn't that treatment worth anything?" My answer was, "Yes, worth five dollars a day for fourteen days to your doctor friend." A specific instance such as this sounds rather crude and close to chicanery, but you know and I know that this physician was only doing what countless others are doing and in their own hearts they know they are not justified in so doing. However, we as individuals have little use and less respect for these hypo-shooting doctors, and we know that in the majority of instances the injection of this or that substance, drug or serum, in cases of active pulmonary tuberculosis is not indicated, is apt to be harmful, and not infrequently is just plain mercenary and dishonest.

We are continually hearing of new cures for tuberculosis varying from electric wave lengths, or heat units, to curative inhalations, chemical combinations of drugs or extracts that kill the tubercle bacillus by dissolving the fatty capsule, and therapeutic rays of one kind and another. For the first, suffice to say it smacks of the Abrams Treatment. Regarding the vaporum and inhalation idea it is quite true that the inhalation of certain medicated vapors tends to soothe the inflamed surfaces in sinusitis, tracheitis and bronchitis, and lessens cough and gives some relief. Codein is an indispensable drug in pulmonary conditions, but I have never heard it called a cure for tuberculosis even though it lessens cough and gives considerable relief. Various chemicals, drugs or extracts may dissolve the fatty capsule of the tubercle bacillus in a test tube and may do so in the lung, but if such is the case you may be sure it will also cause a lysis of the protective tissue nature is trying to build up around the infected area. Recently I saw a patient whose hemorrhage was caused, I believe, by just such destruction. As to infra-red and ultra-violet rays from therapeutic lamps and actual sun baths, I believe, in active pulmonary tuberculosis, such treatments do more harm than good and are

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Tuberculosis: Its Present Status

WE DO NOT DIE from tuberculosis, but rather from an ignorance of it. This proverbial saying embodies

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an intense truth, but even more striking is its corollary, that in education we have a powerful weapon with which to fight this disease. The object of this article is that the reader will receive some enlightenment with which to do his part in carrying on the battle against the Great White Plague. While much has been accomplished, the death rate at the present time reduced, the scourge still remains among us and leaves much to be done. The remote effects of the recent depression remain to be seen, but a rise in the morbidity curve may most likely be predicted. We know and hear a great deal concerning cancer and the mere mention of this dreaded malady fills the soul with terror, but as a menace to our social and economic welfare, its ravages fall far short of those due to tuberculosis. Tuberculosis strikes in the most fruitful and productive period of our lives, most deaths occurring between the ages of 20 and 40. The sufferers are victims of a long wasting disease which, in most cases, leaves them dependent upon relatives, friends or institutions of charity. Cancer, on the other hand, reaps its grim harvest in later life or in the so-called cancer-age which is 40 and beyond. Its victims have, as a rule, passed through the prime of life, suffer a disease of a shorter duration and are therefore more seldom left dependent on others.

More has been written and more research work done on tuberculosis than any other disease or possibly as much as on all other diseases combined. It has been known since antiquity, excellent descriptions having been handed down from the ancients, Galen and Hippocrates. The causative organism, the tubercle bacillus, was discovered over 50 years ago and its infectious nature proved years before that. The disease is widely disseminated in the

animal kingdom, even occurring in reptiles and toads. It may affect any organ in the body, but

shows a particular predilection for the lungs. Today, a veritable army of workers in the research laboratories and clinics over the world are constantly striving to further our knowledge of this disease. Much is coming to light from the study of the bio-chemistry of the tubercle bacillus and its products.

From time to time one reads and continues to read in the lay press, fraudulent claims for a cure of tuberculosis. Before yielding to these tempting and enticing promises of cure, investigate their authenticity, the cradle of their birth. The long sought-for specific or cure has not been forthcoming. Much, however, has been accomplished and it is startling to realize that of all the chronic diseases producing death, tuberculosis is the most curable. This, however, implies early diagnosis and proper treatment.

Accomplishments in this field of work have been secured along the following lines: improved methods for early diagnosis, improved methods of treatment with special emphasis upon the development of surgical and mechanical procedures, observance of helpful health laws, improved sanitation in the home, school, office and factory, elevation of general living conditions, appreciating the value of rest, fresh air, wholesome food, outdoor exercise and avoidance of strain, periodic physical examination, and finally, the education and co-operation of both doctors and public. While we are striving to acquire further knowledge, our chief concern at the present time is the disseminating of that knowledge which we already possess. Captained by the guiding leadership of the National Tuberculosis Association, a vast organization has been formed throughout the country. A large corps of doctors, nurses, health and social workers, are daily working in dis-

pensaries, clinics, hospitals, factories, schools and homes, making examinations, treating those afflicted, and teaching the gospel of prevention. Supplementing these efforts are numerous lectures, pamphlets, circulars and posters, sponsored by the National Tuberculosis Association. Out of this extensive program there is gradually evolving and emerging a formidable array of resistance to the incursion of this disease, and the more hopeful of us see in the future an eventual eradication of this plague.

Doctors and nurses are being better trained in tuberculosis, adopting improved methods of diagnosis and treatment and learning better to evaluate the significance of certain signs and symptoms. No longer is the spitting of blood-stained or blood-streaked sputum casually dismissed with the explanation that it comes from a blood vessel in the throat. It is now realized that over 90% of all instances of obscure blood spitting is due to tuberculosis. They have learned that most cases of pleurisy, particularly the wet variety, are caused by a tuberculous infection and that unless these patients are properly cared for, subsequent mischief will develop in the lungs. The merits of the three fundamental principles in treatment are becoming universally appreciated and established. They are first, and by far the most important, rest, and this should be both mental and physical, second, fresh air, and third, good wholesome food. Exercising to build up the strength, and stuffing with raw eggs and milk have been shown to be unwise and that they often invite disaster. The most effective measure for reducing the fever, checking the cough, and building up the strength is now no longer questioned, it is absolute bed rest. The importance of periodic examinations of all members of a family where a case of tuberculosis has occurred, as well as those individuals who have been closely associated, particularly in childhood, with such a case, is being more and more appreciated. Childhood infection and early diagnosis have probably received the greatest emphasis in the past few

years. Gross examination and case finding by means of the Mantoux or intracutaneous tuberculin test, using the recently developed PPD tuberculin, has played a prominent part in this work.

The layman is learning more and more to familiarize himself with the symptoms of early tuberculosis and go to a doctor at a time when an early diagnosis can be made and when treatment can avail. Formerly, and not so many years ago, to be diagnosed tuberculous was to die, today it is to live. Tuberculosis should be diagnosed in the doctor's office and not in the home at the bedside, for under the latter circumstances the diagnosis is usually being made too late. The enlightened public is no longer thinking of tuberculosis only in the picture of the far-advanced case with extreme emaciation, high fever and wacking cough. They entertain suspicions and seek advice more and more as they are learning to appreciate the significance of such early symptoms as a persistent tired feeling, gradual and unexplained loss of weight, a slight cough over several weeks duration, a tendency to persistent hoarseness and clearing of the throat, a slight afternoon and evening fever, blood-spitting, however slight in amount, persistent chest pains, night sweating, and vague digestive and nervous disturbances.

Let us hope that with the ever-increasing mobilization and strengthening of our forces, the battle against our foe will continue to be waged and to eventually come to a triumphant end.

The Fluoroscope in Diagnosis

A FLUOROSCOPIC examination is of value in that it enables the examining physician to detect the presence of pleuritic effusions without having to wait for the making of an X-ray film, it shows the movement of the diaphragm, and the expansion and movement of the lungs in forced inspiration, but it does not give us the detail in structure or show the minute changes in the lungs which the film does show, therefore, it cannot take the place of the film in diagnosis. R B H

Tuberculous Bacillaemia

IN ADVANCING the frontiers of the knowledge of disease, conceptions will develop which only time and exhaustive investigation can prove correct or incorrect. It is obvious that the clinician, in his conduct of the case at hand, is guided by conceptions which must change as the frontiers of science are advanced. It would be rash to claim that medical science is so advanced that unknown frontiers no longer exist. Yet in this advance there will arise new conceptions, and old conceptions will be fortified by recent progress or be restated by the inception of a new technique where ample grounding may have been lacking. Even failures may be said to possess some merit, although when evaluated in the terms of labor may prove a temporary deterrent to progress.

Tuberculosis, like cancer, cannot yet be removed from the category of medical enigmas. The frontiers for intelligent investigation are still numerous in this disease. The average student reading the massive literature is confused by the *pros* and *cons* presented on every prevalent conception.

Pertinent to this is the recent exhaustive rediscussion of tuberculous bacillaemia or bacteremia. Periodic efforts to place tuberculosis in the category of bacillaemic diseases have been numerous, but two of them are outstanding. In 1908-9, Rosenberger electrified the tuberculosis world by finding tubercle bacilli in the blood of all of 125 cases and in at least one case where physical signs of the disease were lacking. The positive findings were subsequently proved to be due to faulty technique, and for the time being, tuberculous bacillaemia was relegated to the archives of forgotten conceptions, since microscopic examination of the blood proved faulty for such purposes. Then followed a confused discussion regarding the virulence of the bacilli and

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the inadequacy of animal inoculation for purposes of demonstration.

About this same time Much's granules occupied the arena, and filterable forms of the virus began to confuse the issue. Although Biem, in 1909, demonstrated the possibility of error due to the existence of harmless acid-fast bacilli in distilled water, not until recently was their universal presence acknowledged. Thus Eichbaum, in 1932, reported finding them in sixty water taps and tubs in different buildings in Frankfurt. As early as 1912 Liebermeister found them in pepsin preparations, as well as trypsin, while Baetge found them in cedarwood oil.

Even guinea pig inoculation requires cautious interpretation because of possible errors. If acid-fast bacilli are used as criterion, precaution must be used to avoid errors from extraneous contamination sources. There is also the possibility of error in the presence of spontaneous tuberculosis, pseudo-tuberculosis, as well as diseases producing tubercle-like lesions in these animals. With the advent of better and newer culture methods, this means of study was resorted to.

The use of cultures for blood examination was not new, having been reported on a number of times from 1906 to 1930. As early as 1905, Loewenstein reported on obtaining cultures from blood of infected guinea pigs and rabbits. In 1930, however, Loewenstein seriously began to study the cultivation of tubercle bacilli from the blood and presented his acetic acid-sulphuric acid preliminary treatment, with culture on Loewenstein's Congo red, potato flour, asparagin, egg medium. His results were remarkable. An exact account of the results was rendered difficult for many reasons, since they were reported not only by Loewenstein himself but by his pupils in widely scattered places, and duplication in case reports was frequent. Positive findings were not

only obtained in an exceptionally high percentage of tuberculous cases but also in non-tuberculous cases

A survey of the data accumulated with Loewenstein's method since 1930 in definite cases of tuberculosis are more conflicting. Loewenstein reports from 30 to 100 per cent results, the average figures by other workers varied from 0 to 20 per cent. The occurrence of positive results in non-tuberculous disease was very puzzling. Several workers who obtained a high proportion of results for postmortem heart blood on experimentally infected animals always completely failed to isolate genuine tubercle bacilli from the blood of living tuberculous patients. Workers who examined blood both by culture and by guinea pig inoculation are in almost complete disagreement with Loewenstein's findings.

The interpretation of "microscopic" positive culture advocated by Loewenstein and "macroscopic" positive culture has led to disagreement. The microscopic method of examining a blood culture is open to the same objections as those for the direct microscopic examination of blood. Critical examination of the culture results obtained by workers subsequent to Loewenstein show that in a total of over 6,000 blood cultures made during life from tuberculous and non-tuberculous patients macroscopic growth of acid-fast bacilli, suspected of being tubercle bacilli, occurred on only seventy-two occasions. How many of these consisted of genuine tubercle bacilli it is impossible to say, since very few of them were adequately studied.

If these figures are accepted, however, as bona fide tubercle bacilli, there is no doubt that the percentage of positive findings for tubercle bacilli in the blood of evident tuberculous individuals is far below that accepted for proving a tuberculous bacillaemic or bacteriaemic condition.

A few more recent results and conclusions may be pertinent to this discussion. In 1933, the British Medical Research Council reported on the examination of 282 tuberculous and 122 non-tuberculous

patients, the blood being cultivated by Loewenstein's technique. The positive results obtained were three of the human type derived from patients with severe pulmonary tuberculosis, one human type from the heart blood in postmortem from a case of tuberculous meningitis, while at the same time seven macroscopic cultures of chromogenic saprophytic acid-fast bacilli were derived from four patients with pulmonary tuberculosis, two with non-pulmonary tuberculosis, and one with schizophrenia. The Research Council group did not contribute to the conception of a tuberculous bacillaemia in the usual case of tuberculosis.

In the same year, Corpe, Damerow, and Cohn of the National Jewish Hospital at Denver, Colorado, report on the inability to find tubercle bacilli in the blood of 120 patients with advanced tuberculosis in spite of the fact that each blood specimen was submitted to four different methods of examination, namely, guinea pig inoculation, and three different culture methods. They point out that acetic acid as recommended by Loewenstein destroyed small numbers of human tubercle bacilli while saprophytic acid-fast bacilli would survive such treatment, thus vitiating the results obtained with this reagent. They conclude that human or bovine tuberculo-bacteraemias, in the sense that tubercle bacilli circulate in the blood for a fairly long time or that the bacilli multiply in the blood, are not borne out, although it is not intended to convey the impression that occasional embolic disseminations (showers) from disintegrating tuberculous foci do not occur or that there may not exist terminal periods in the course of the disease when numerous showers containing viable bacilli may make it possible to find them in the blood of man or experimental animals. However, such a condition of tubercle bacilli in the blood is far from being the common event, and embolic showers (embolaemia), when they do occur in man, are rapidly removed from the circulation in the usual case of tuberculosis.

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The Tuberculin Reaction

THE INTRADERMAL injection of Koch's Old Tuberculin introduced by Mantoux in 1907 as a diagnostic measure, is to-day the most satisfactory means of diagnosing tuberculous infection. Because of the controversy in the literature of the past, many physicians have been led to discredit its value in diagnosis and misconceptions abound concerning the significance of the reaction, the importance which may be attached to a positive or to a negative reaction, and the proportion of individuals reacting positively to the test.

What does the tuberculin reaction signify? The tuberculin reaction is essentially the visible indication of the reaction produced by injecting tuberculin into the body. A positive reaction, indicated by an area of redness and oedema at the site of inoculation, indicates that at some time previous to the test living tubercle bacilli entered the body and gave rise to tubercle formation usually in the lungs but occasionally in the kidneys, the bones and the lymphatics of the abdomen or of the neck.

What significance can be attached to the finding of a positive tuberculin reaction? Inasmuch as a positive tuberculin reaction indicates that the body has at some time become infected with tubercle bacilli, it was originally believed to indicate active tuberculosis. Later, many positive reactions were found in individuals who were never discovered to be tuberculous as we understand the term, so observers were inclined to attach little significance to the finding of a positive reaction. The literature of the past few years has indicated quite definitely that such an attitude is not only fallacious but also harmful, for many reactions have been ignored and the disease has progressed where otherwise it might have been checked. The finding of a positive tuberculin reaction is certainly an indication for the most painstaking and thorough physical

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and laboratory examination to find the original focus. Although it is generally taught that a positive reaction may be obtained even after dead acid-fast bacilli have been thoroughly and securely encapsulated by a calcified wall, observers have found that only too often acid-fast bacilli have been encapsulated without undergoing disintegration and even years subsequently have become sufficiently active to produce disease, in necropsy material lesions may be active continuously, although apparently clinically healed while apparently healed lesions may become active after years of presumed quiescence, hence the maxim, "Once infected, always infected."

For these reasons, some investigators feel that a positive tuberculin reaction means the presence of active, viable tubercle bacilli which may not be causing damage sufficient to be detected by our present means of diagnosis. Certainly no one is warranted in regarding lightly a positive reaction even in the absence of positive physical signs or symptoms. Whether or not a positive tuberculin reaction indicates immunity, it is certainly no asset to the individual, the common belief that a positive reaction indicates that the individual has become partially immunized to the tuberculosis and is less liable to develop tuberculosis is not supported by current studies. The bulk of the evidence tends to indicate that a positive reaction signifies infection with a tuberculosis which may or may not become clinically active.

What does a negative tuberculin reaction indicate? A negative reaction to the tuberculin test, properly applied, means that the individual is so fortunate as to have escaped infection with the tubercle bacillus. In exceptional instances, a negative tuberculin reaction may be associated with a tuberculous infection. Such instances include the loss of allergy of far advanced tuberculosis, apparent cure of tu-

berculosis, and exanthematous fevers, notably measles. Inasmuch as a positive reaction does not occur until 3—6 weeks after infection with the bacillus, a tuberculin reaction applied during the period of development of allergy may be negative. Such instances are decidedly in the minority, unless one of the above conditions exists, one should always regard a negative tuberculin reaction as indicating absence of infection with tuberculosis.

How many individuals have positive tuberculin reactions? With the introduction of tuberculin skin testing, it was only natural for the test to be applied first to hospital and dispensary patients. In Vienna, Pirquet found that about 92% of children at the age of 14 years reacted positively. Hamburger, working in a contagious disease service of the same city, found about 95% of children to have a positive reaction. These and similar statistics made so profound an impression that it is generally assumed that almost 100% of adults will react positively to tuberculin. These misconceptions have persisted despite the newer developments in the long fight against tuberculosis. Most of the subjects utilized for the studies were children of homes wherein the elementary principles of anti-tuberculosis measures were unknown. Many of them doubtless had tuberculosis unrecognized by the methods of diagnosis then employed. The incidence of tuberculosis has fallen markedly in the past quarter-century as morbidity and mortality charts have been invoked to demonstrate, therefore, it follows that there should be fewer individuals with positive tuberculin reactions than in 1907. Despite this, there is still a common impression that a positive tuberculin reaction should be disregarded because nearly everyone "has tuberculosis at some time in his life."

Recent investigations most certainly do not confirm such impressions. It is true that the incidence of tuberculous infection increases with age, but by no means is the anticipated incidence of 95—100% attained. In Honolulu, of 1,437 school children between the ages of 11—18 years,

75% reacted positively. Dickey and Seitz found that of their group of San Francisco children of 1—14 years of age, only 23.5% reacted positively. In a recent Texas survey, 20% of a similar age group reacted positively, in certain sections of the Middle West, the incidence has been lower than 1%, of freshmen entering the University of Pennsylvania, 49% were positive, 30% of University of Wisconsin freshmen were positive, only 20% of 550 high school students of Minnesota were positive reactors, of 1,000 children between the ages of six months and sixteen years entering the Mayo Clinic from all parts of the United States, only 16.5% were positive. In this connection it is well to recall the warning of Johnston and Chadwick that one cannot study a few hundred cases in a given city and generalize accordingly, it is necessary to study large groups in order to avoid individual differences. It has been found that children of various parts of the country and even of different sections of the same city have varying rates of incidence of infection. One of the largest single surveys of this country, that of the Massachusetts ten year program, has included about 100,000 children in an incomplete tabulation, of these, only 28.5% reacted positively.

These variations are not due to differences in technic or to human error, they are of far greater significance. They reveal that as a result of the perfectly tremendous amount of human endeavor expended in the past several decades of anti-tuberculosis campaigns, the incidence of infection with tuberculosis fell as the rates of morbidity and mortality dropped. It is significant that in most of the communities where such comparison was afforded, the lowered rates of infection were accompanied by lower mortality rates. The varying rates of incidence of positive tuberculin reactions within this country merely indicate that progress in this direction has not been equal all over, but that certain sections have made more rapid strides than others. In general, rural communities appear to have less tuber-

culous infection that do urban centers. A study of interest is that of Ustvedt of Norway who tested the town's children and found that 24% of them reacted positively, whereas Arnfinnsen had found 38% positive when he conducted his investigations during 1914, thus there had been recorded a decreased incidence of 14% in 20 years. It is also of interest that he could conclude from his calculations that the age at which the first infection was acquired had been deferred from childhood to adolescence. Such conclusions are corroborated by the finding that in this country, at least 50% of students entering some Universities have never experienced tuberculous infection.

What proportion of reactors have active or demonstrable tuberculosis? The answer to this question must necessarily be inadequate because a positive reaction was hitherto disregarded so often that no adequate follow-up was instituted. Where such studies were begun, it was found that from 3—59% of the positive reactors had evidences of the childhood disease and from 1—6% had roentgenologic evidences of the adult forms of lesions. These computations, it must be understood, are for groups of individuals none of whom considered himself ill in any way when the investigations were begun and none of whom gave a history of tuberculous disease in the past. If these figures seem unimpressive, it should be noted that the prevailing methods of diagnosis of tuberculosis leave very much to be desired. Most studies were concluded with a single roentgen examination of the chest, a few studies included repeated chest examinations in the course of which unsuspected lesions of tuberculosis were found on the roentgen film. Most observers feel that failure to demonstrate a focus of tuberculosis in an individual with a positive tuberculin reaction is unsatisfactory. It is known that an active focus may exist and be too small to be visualized or be concealed behind the shadow of the heart. Somewhat encouraging is the report that a few such inaccessible lesions have been visualized by a special radiographic tech-

nic. This is, however, exceedingly costly and time-consuming and is beyond the reach of the average investigator. Possibly if a complete roentgenologic examination of the lymphatic and osseous systems were available, it might be possible to discover yet other foci of primary tuberculosis in individuals who are at present dismissed as having no tuberculosis because none was discovered in a roentgenogram of the chest.

These observations apply to the first infection type or the so-called childhood disease which has always occurred by the time that the tuberculin reaction has become positive. Although 80—90% of these individuals are never known to succumb to tuberculosis, it should be realized that very few of them have the benefit of repeated chest examinations and may appear to be in fair or even good health while tuberculous lesions of the lungs are progressing. Robertson's necropsy findings of active tuberculosis in individuals apparently clinically cured and of histologically active lesions in lungs in which tuberculosis was presumed to have been quiescent are only confirmatory of the observations of some investigators who have found active, viable bacilli in calcified areas with all the clinical, roentgenological and gross pathological appearances of healed lesions. From all the foregoing, it may be inferred that when no active tuberculosis can be found in individuals with positive tuberculin reactions, some cases of active tuberculosis are being ignored.

What are some practical applications of the test? Because the positive reaction means infection and because the negative reaction may generally be interpreted as absence of infection, the test may well be utilized to determine which members of a group of individuals have become infected with tuberculosis. One of the ideals to be attained is the application of the test at regular intervals throughout the life of an individual from infancy onward, in this way, one could actually determine the time of infection with tuberculosis and would not only treat the earliest manifestations of tuberculosis, but could also

study the actual development of the disease in all its aspects. That some startling data would be accumulated in this fashion is evident from the findings of those who have investigated the reaction from infancy onward and have found that, contrary to general belief, the positive tuberculin reaction in infancy does not portend a grave prognosis *per se*, many such infants live to swell the ranks of those who have a positive reaction and are never known to develop active tuberculosis. Certainly it would open to research vast new fields for investigating the value of any test for activity of tuberculosis or of any therapeutic agent which would halt the progress of the disease before advanced lesions were found. That this ideal is yet very far from attainment must be admitted now, still the idea is so intriguing that one can only hope that some day it will be realized. Another utilization of the test is that of determining the damage rendered by the necessary exposure to tuberculosis which is a portion of the routine of physicians, nurses and medical students. From various parts of the country are heard expressions of dissatisfaction concerning the present morbidity and mortality rate of tuberculosis for medical personnel. It would be of great value to apply the test to all the medical and nursing staffs of a given institution and if positive reactions were found among individuals who had negative reactions before such exposure, such individuals could be examined for evidences of tuberculosis. If a considerable number of such people acquire tuberculous infections in this manner, it would be advisable for this institution to consider means of checking the spread of the disease.

Is the tuberculin reaction safe? One frequently encounters the fear that the general application of the tuberculin test is apt to be followed by reactivation of a tuberculosis previously quiescent. Such fears are not well grounded for the introduction of tuberculin in any amounts into the body of an individual who has never been infected with tubercle bacilli cannot be followed by any ill effects, while the

introduction of tuberculin within the skin of even a tuberculous patient is not attended by any serious mishaps. The ill effects reported are those of the subcutaneous and not the intracutaneous application. The recent application of the tuberculo-protein, the so-called TPT of Florence Seibert or the commercially available PPT renders skin testing more practicable, for this can be standardized and is effective in amounts small enough not to cause objectionable local symptoms.

Conclusions

1 The intradermal tuberculin reaction is of great value in determining the presence or the absence of tuberculous infection and should be a part of every general physical examination.

2 A positive tuberculin reaction should not be disregarded even in the absence of all signs and symptoms because it indicates that the body has been infected with tuberculosis.

3 Any individual with a positive tuberculin reaction should have the benefit of periodic search for the primary focus of tuberculosis.

4 The more general application of the tuberculin skin reaction in the earlier age group will be followed by an earlier diagnosis of tuberculosis in a number of instances sufficiently great to merit the trouble and expense required.

HANSEN, OLGA S and MALAY, HENRY W
The Heart After Phrenic Nerve Interruption.
American Review of Tuberculosis Vol 30,
No 5

The authors summarize a study of one hundred cases of unilateral diaphragmatic paralysis by phrenicectomy. The studies were made by the electrocardiograph and x-ray observations before and after the operations. The observations were continued until the full effect from the paralysis of the diaphragm had been obtained.

Changes noted

- (1) P waves changed only six times
- (2) A change in direction and amplitude of the Q R S waves in sixty five
- (3) T wave changes appeared in twenty three cases
- (4) The heart position was displaced from its free operative position in sixty nine cases
- (5) No evidence of heart damage appeared

A Simple Method of Obtaining Skiagrams In Artificial Pneumothorax Work*

ALL ARTIFICIAL pneumothorax work should be controlled by repeated examinations of the patient under the X-rays,

and, if possible, records should be kept of the condition of the chest on certain dates. The usual method of keeping such records is to take an X-ray photograph every two or three months. This method involves considerable expense and time, particularly if prints of the negative are desired to complete the clinical notes of the patient. When a large number of patients are receiving treatment, it becomes necessary to engage an assistant to do the photographic work, thus the expense of obtaining the necessary information is still further increased.

In order to economize both time and money, the following method was devised at the Warwickshire King Edward VII Memorial Sanatorium, and is proving most successful. The apparatus required, in addition to the usual fittings to an X-ray outfit, is extremely simple. It consists of a clean, smooth gelatine film, made by washing off the photographic film of an old 15-inch by 12-inch negative, a roll of adhesive plaster, soft black and red grease pencils, black and red pastels, xylol, and sheets of typing paper the size of the gelatine film. The method of obtaining a record of the condition of the patient's chest is again simple, and requires very little practice. A good screen is obtained with about 1 to 3 milliamperes. The gelatine film is fixed over the center of the fluorescent screen by three strips of adhesive plaster. The patient is placed in the usual position, and the fluorescent screen pressed firmly, but gently, on to the chest. The distance of the screen from the tube is noted and marked with the grease pencil on a corner of the gelatine film. The fluorescent

BY
FREDERICK R G HEAF, B A, M D
and
R A C MACNAIR, M B, B CH
London, England

screen is then fixed, and the current switched on.

The outline of the thorax, with the clavicles, the diaphragm and

the heart, are quickly sketched on to the gelatine film with the grease pencil. Then any definite lines made by the shadow of collapsed lung, fluid, or calcareous masses are marked. All these will be seen quite plainly through the film. The lower edge of the film is then released and gently raised, and the finer variations of the shadows on the fluorescent screen are observed. The film is then replaced, and as many as are thought necessary of these shadows are recorded. The marking of these finer details requires a little practice. The current is now switched off, and the film is removed. If necessary, the procedure can be repeated for the back view with another clean gelatine film on the fluorescent screen.

In practice it is found that the gelatine film-tracing can be easily made in one minute, so that there is no danger of the patient being injured by the X-rays. The film is taken and placed in a viewing box, with a sheet of typing paper of the same size over it. The markings of the grease pencil are then traced on the paper with pastel and shaded with a shading stump, the result being a pastel tracing of the important shadows seen on the fluorescent screen. The paper is then removed from the viewing box, pinned on to a board, and the pastel fixed by pouring boiling milk evenly over it, it should then be hung up, and allowed to dry thoroughly, this prevents smearing, and makes the drawing permanent. This record, which we call a skiagram, is then named, dated, and filed. The films are carefully cleaned with xylol on cotton-wool swabs, and are ready for use again.

(Continued to page 22)

*Reprint from British Journal of Tuberculosis

The Sanatorium

BEFORE THE discovery of the tubercle bacillus, the treatment of tuberculosis did little in arresting the disease. In 1840, George Bodington, an Englishman, advised outdoor living as a means of regaining health, and later established the first sanatorium. His ideas were not gratefully accepted and he was denounced and persecuted and forced to abandon his institution.

In 1859, Dettweiler established a sanatorium in Germany, and this institution lived through the ridicule of the times.

With Koch's discovery of the bacillus in 1882, a new impetus was given the tuberculosis problem.

In 1884, Dr. Trudeau established his world-renowned sanatorium in Saranac Lake, and this was the beginning of the great sanatorium movement throughout the world. Today every country within the circle of civilization boasts institutions, both private and public, for the care of the tuberculous.

Considering the enthusiasm of the sanatorium movement, it is astonishing that only a small percentage of tuberculous individuals could avail themselves of sanatorium treatment if they so desired. The number of beds is far from adequate to care for the large army of people afflicted with tuberculosis. Still, it is the opinion of most specialists that, for a time at least, patients should be placed in an institution. If finances do not permit a residence until cured, a few months will prove an excellent education. The patient leaves with a knowledge of what to do and what not to do, which will prove invaluable when he attempts to follow out the cure at home.

So much is being written today relative to compression therapy making a stay in a sanatorium unnecessary, that a word of warning seems in order. Patients' lungs are compressed by artificial pneumothorax and in a month's time they are

BY
LEROI S. PETERS, M.D.
Albuquerque, New Mexico

returned to work, being given to understand that the disease is arrested.

Tuberculosis is not cured in a day, and even though a lung is put at rest, time only and proper living can effect a cure.

In my opinion, all cases on whom compression treatment is considered should be in a well-conducted sanatorium and kept there on a comparative rest regime for many months. This I realize cannot be done in all cases. We find many without means on whom we do a collapse to make it possible for them to work and still get by. If possible, these patients should enter one of the philanthropic institutions—state, municipal or county—until such time that danger from resuming their occupation is passed. The indiscriminate use of compression therapy in the home should be discouraged where it is possible to place the patient in an institution.

The earlier the diagnosis is made and the earlier the patient reaches the sanatorium, the better the chances of effecting a cure. Too many people fight the idea of institutions, thinking contact with sick people tends to discourage. This is the opposite of the truth. Properly conducted sanatoria provide a pleasant atmosphere, and the average person is far happier in these surroundings than when treated at home.

When one considers the army of far-advanced cases of tuberculosis throughout the country, one realizes that this stage of the disease has been reached through poor advice or through lack of taking good advice.

If all disease could be diagnosed early and all patients given sanatorium care, there would be little reason to fear the outcome. In properly-conducted institutions, ninety percent would make perfect recoveries, and the advanced consumptive would be but a memory.

SUPERVISED GRADUATED EXERCISE IN THE TREATMENT OF PULMONARY TUBERCULOSIS
(Continued from page 8)

eral feeling, appetite, weight, nervousness, returned inclination to cough, everything must be watched and assessed. If any symptoms return, all exercise should cease and the patient return to bed rest. After the symptoms disappear and have been absent for a week, exercise may be returned where it was discontinued and not in the way of its beginning.

If everything goes well, this weekly increase in exercise should be continued until the patient is employed in walking, or its equal, for five or six hours daily. By this time the patient should be well enough to go home and return to his work. For a month or two it will be much safer to work in the forenoons only—resting in the meantime, three hours in bed after the noon meal. Early bed hours at night should be followed.

After one has any appreciable tuberculous involvement, the road back to normal is a long and tedious one. But it is the only safe course. It is on this road where so many patients lose their way and wander into dangerous thickets from which extrication may be impossible.

Every one who has had tuberculosis should know that full capacity and restoration are rarely obtained under two years—often longer. The patient must learn to treat his body like a careful business man treats his bank account—store it up rather than use it up—conserve it and not dissipate it.

This plan is trying but trustworthy. Good health is the foundation of usefulness and happiness. It is worth anything we may have to pay for it. Without it life is a burden and the victim a liability.

HOW NOT TO TREAT TUBERCULOSIS

a frequent cause of hemoptysis. An overdose of sun is as dangerous as an overdose of tuberculin or arsenic.

Hemorrhage in pulmonary tuberculosis is of rather frequent occurrence and is often frightening to the patient and the doctor. Morphine has been and unfortunately still is, with many doctors, a favorite drug in the handling of this complication. Morphine is a drug that should never be used in pulmonary hemorrhage, and its use cannot be too strongly condemned. Its use simply predisposes to hypostatic pneumonia, and then we have the added complication of a tuberculous pneumonia. In massive hemorrhage death occurs so quickly that no treatment is of any avail. If the patient is alive when the doctor arrives, the odds are all against death occurring from that hemorrhage, and the mere presence of the physician, and his calmness and assurance to the patient that

(Continued from page 10)

he is not going to die, is of tremendous importance to that patient. The two best procedures in the prevention and control of pulmonary hemorrhages are induced pneumothorax and blood transfusion. Absolute flat bed rest is of course essential and large doses of calcium and some of the various blood coagulants, are probably of help, but are certainly no panacea.

These remarks have had to do with how *not* to treat pulmonary tuberculosis. For the treatment suffice it to say at this time, this consists of accurate and early diagnosis, having the patient under control, sufficient knowledge of tuberculosis and the various methods of treatment, to decide whether bed rest, supportive regime under a sensible well-balanced diet, close supervision, etc., are sufficient, or whether pneumothorax or thoracic surgery is indicated, and, if so, when indicated.

TUBERCULOUS BACILLAEMIA

Likewise, Saenz, in 1934, points to the fallacy in using microscopic colonies as a criterion since these bacilli may be found in rubber tubing or in various solutions that have been employed in preparing the

(Continued from page 14)

culture medium or stains. Only in one- and two-tenths per cent of 500 cases of various forms of tuberculosis did he obtain macroscopic growth, and of the ten positives three proved to be saprophytic.

acid-fast bacilli Cases of rheumatism and samples of cerebro-spinal fluids were all negative

Thus, it would appear best at present

to view tuberculosis in the usual case not as a condition of bacillaemia but rather as a disease of occasional embolic complication

A SIMPLE METHOD OF OBTAINING SKIAGRAMS IN ARTIFICIAL PNEUMOTHORAX WORK
(Continued from page 19)

When information of the condition of the patient's chest is again required, the skiagram is placed in the view box, with a clean gelatine film over it. The main outlines are marked on the film with red grease pencil, paying particular attention to the position of the edge of the lung, or the surface of fluid, or any other feature that is of interest. The patient is placed in position for screening, and the film with the red tracing is fixed to the fluorescent screen, care being taken that the latter is the same distance from the tube as on the previous occasion.

The film is then adjusted so that the clavicles and outlines of the chest are superimposed on those of the patient under examination, this requires care. All variations of the position of organs are now marked with black grease pencil, and the process of obtaining a tracing is repeated, either on the original skiagram,

using red pastel, or on a new piece of typing paper. The tracing is then fixed in milk, named, and dated, and so a second skiagram is produced. By this method we obtain a permanent series of pictures of a patient's chest, showing very clearly and with considerable accuracy the changes which have occurred in any particular condition under observation.

The method is recommended because it is simple, rapid, and economical, and although it probably will not be of use to the expert radiographer, we think it may be of use to many engaged in artificial pneumothorax work who require a record to enable them to compare screen examinations without resorting to photography, which is a somewhat costly and lengthy process, and, unless done by a specialist, may give results which do not give the required information, and therefore does not justify the expense.

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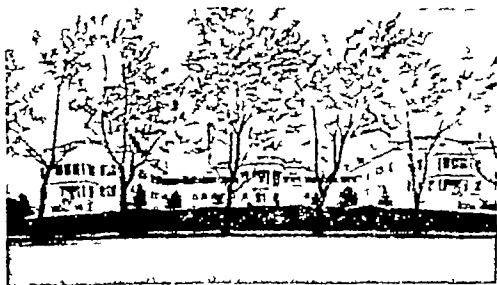
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DOCTOR! The Federation of American Sanatoria respectfully calls your attention to its special offer to you as outlined on page 32 of this issue. The Editor-in-Chief of DISEASES OF THE CHEST has been receiving numerous comments from physicians everywhere, and would appreciate your comments also.



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ABSTRACTS



This department is devoted to abstracts of articles carefully and judiciously selected by the Editorial Staff

PEDRINONI, G. Rilievi clinici su un caso di litiasi polmonare. Riv di Patol e Clin della Tuberculosis, 258

Pulmonary lithiasis is a rare condition. Although occasionally small granules may be found in the sputum of tuberculous patients, the presence of a real calculus with clinical symptoms is exceptional. The subject is of practical interest for two reasons. First, because the occurrence of symptoms due to a calculus may be misinterpreted and attributed to other factors, and secondly, on account of the prognostic and therapeutical importance of pulmonary lithiasis. With very rare exceptions the calcareous concretion represents an extinct or latent tuberculous focus. The color of the calculus is greyish-white, the surface porous and spongy, and the size varies from that of a grain of rice to that of a hazel-nut. Its chemical composition varies, but carbonate or phosphate of lime always predominates, and is accompanied by traces of phosphate and carbonate of magnesia and small quantities of organic substances such as fat and cholesterol. The symptoms in almost all the cases on record are retrosternal pain and a sense of suffocation. The pain is due to irritation of the bronchial mucosa caused by the presence of the concretion, and the sense of suffocation is partly of mechanical origin and partly a reflex phenomenon as in biliary and renal lithiasis.

Pedrinoni records a personal case in a woman, aged 38, the subject of chronic pulmonary tuberculosis, who during a fit of coughing expectorated a large calculus, consisting mainly of calcium phosphate and carbonate with traces of magnesium carbonate and phosphate, fat and cholesterol. The symptoms of cough, pain and dyspnoea were considerably relieved, but

death took place some months later, and evidence of advanced pulmonary and laryngeal tuberculosis was found at the necropsy.

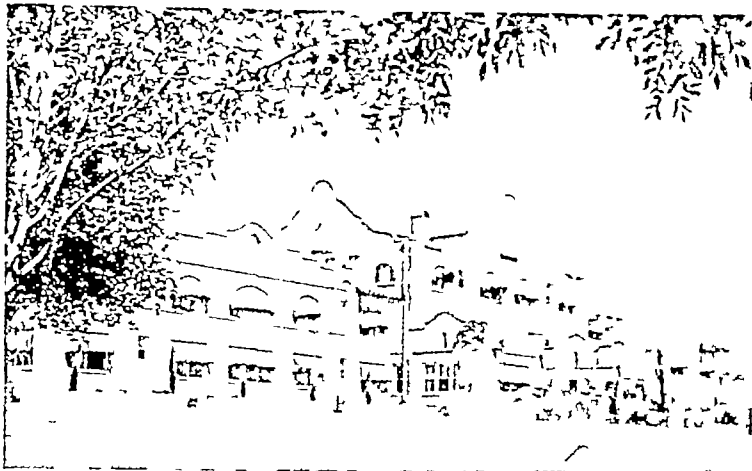
MOORMAN, Lewis J. Advanced Pulmonary Tuberculosis. Annals of Int Med Vol 5, No 8, p 1022

The dominant theme of practically all discussions dealing with clinical tuberculosis has been early diagnosis and early treatment. While the significance of this theme is perfectly obvious, there still seems to be a general lack of interest in tuberculosis. This may be accounted for in part by the fact that, until recently, we have been unable to offer any constructive variation in a program which often proved inadequate. It is not surprising that many members of the profession not particularly intrigued by the interesting game of physical diagnosis and not committed to the rather difficult task of phthisiotherapy, should manifest a certain amount of indifference.

Since tuberculosis continues to be one of the prime factors in morbidity, and is responsible for *one-seventh of the world's mortality*, it deserves the serious interest of the medical profession.

While it is necessary to maintain our emphasis upon early diagnosis and early treatment, it is most gratifying to be able to recount the fact that recent advances in the treatment of pulmonary tuberculosis offer a new hope to those suffering from the more advanced conditions which might otherwise be considered hopeless.

In this lecture, Dr Moorman presents three cases with advanced tuberculous lesions and points out the possibilities of treatment such as pneumothorax, unilateral or bi-lateral, the cauterization of pleural adhesions, the various operations on the phrenic nerve, and thoracoplasty.



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COME AND MAKE A HAPPY CURE WHERE THE SUNSHINE ALWAYS SHINES

SMITH, ADELAIDE ROSS Silicosis Among Rock Drillers, Blasters and Excavators in New York City Jour of Indust. Hygiene

As an occupational disease, silicosis has a long history, but it is only comparatively recently, that is to say, within the past twenty-five years, that it has received attention. In the United States the first studies of silicosis were made among the zinc miners of Missouri by Lanza and Childs, in 1917. The present study was made of 208 rock drillers, blasters and excavators in New York City for the purpose of determining the incidence of silicosis among them. Silicosis was found to be present in 118, or in 57 per cent of the men examined. Twenty-three per cent of the men examined showed radiographic evidence of antepimary silicosis, 19 per cent of first stage silicosis, 7 per cent of second stage silicosis, and 8 per cent of third stage silicosis. Blasters, rock drillers and excavators were affected by the disease in frequency and in severity in the order named. Second and third stage silicosis occurred four times as frequently among those who had done under-ground work, as among those who had done only open excavating. The incidence of silicosis among men who had worked only in New York City was slightly higher than among those who had worked elsewhere as well. Ante-primary silicosis was found to be present in conspicuous proportions after five years' exposure to rock dust, first stage silicosis after ten years' exposure, and second and third stage silicosis after twenty years' exposure. Second and third stage silicosis was associated to a noticeable degree with a past history of pleurisy and pneumonia. Dyspnea and expectoration were the only symptoms found to be significantly associated with the disease in this study. Lung signs were in general inclusive, although rales and diminished resonance and breath sounds were found most frequently among those showing silicosis in the second and third stages. Tuberculous lesions revealed by roentgen examination, including both those considered active, and those believed to be probably healed, occurred in nineteen cases,

or 9 per cent of the total number. The incidence of all tuberculous lesions was approximately three times as high in the group of cases showing second and third stage silicosis as in any of the other groups. The author concludes that silicosis constitutes a serious health hazard to rock drillers, blasters, and excavators in New York City.

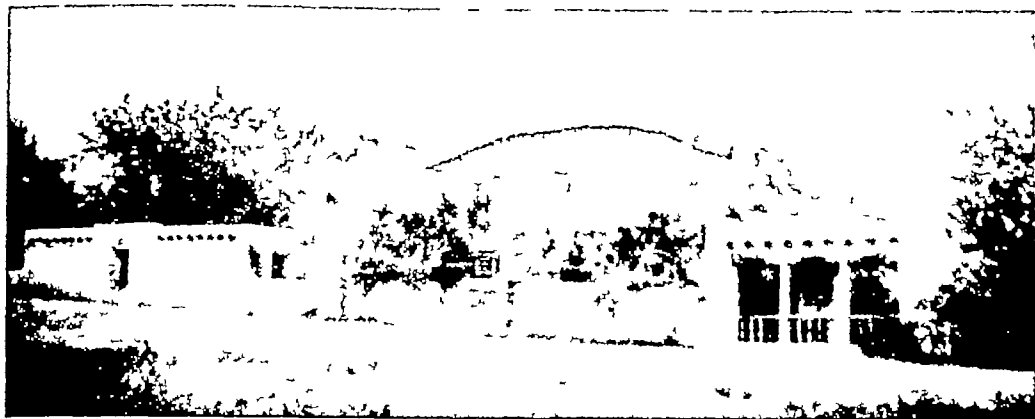
LUDOVICO, P. Relazioni fra resistenza individuale e formula ematica nella tubercolosi polmonare. Riv di Patol e Clin della Tubercolosi, 2, 17

Ludovico made a study of the blood-picture in 24 cases of pulmonary tuberculosis, of which 16 showed a tendency to recovery and 8 ended fatally. In almost all the cases there was a slight degree of anemia which improved in the cases which tended to recover and remained almost stationary in those which took a downward course.

In almost all cases the color index was above unity. In all cases there was a leucocytosis which tended to diminish in cases which improved, but disappeared in those which grew worse. All the cases showed a neutrophil polymorphonucleosis which underwent a pronounced increase in cases which grew worse. Eosinophil polymorphonuclears which were diminished in incipient cases increased in number until they almost reached normal in cases which improved, but disappeared in cases which grew worse. Large mononuclears showed a slight increase in cases which improved, but in the others they were at first normal and then underwent a diminution. Lymphocytes on the other hand were almost normal in cases which improved, but increased at first and later became much reduced in number in cases which became worse.

ROSA, F. La diazoreazione di Ehrlich e la reazione di Weisz nelle forme dei tubercolosi. Giorn med dell osp civ di Venezia, 1, 215

As the result of testing the diazo reaction in 300 cases and the Weisz reaction in 330 cases of tuberculosis Rosa comes to the following conclusions: (1) the diazo and Weisz reactions cannot be of any assistance in the diagnosis of pulmonary tu-



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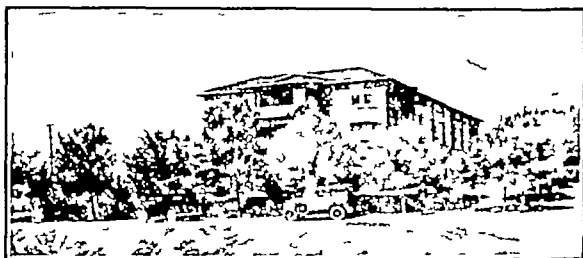
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berculosis, because they are sometimes negative in advanced stages of the disease, or on the other hand may be positive in many other infections

(2) When the reactions are negative they do not possess any prognostic value, especially if they are performed only once, on the other hand, if they are positive and remain so they undoubtedly herald an unfavorable issue. The diazo reaction may become positive as the tuberculous process becomes aggravated or becomes negative as general improvement takes place

(3) In tuberculosis accompanied by several renal complications the prognostic criteria of these two reactions become modified by the albuminuria

(4) As regards the comparative prognostic value of the two reactions a positive diazo reaction is a much more unfavorable sign than a positive Weisz reaction

(5) Whereas the diazo reaction does not appear to be much affected by treatment, the Weisz reaction is always positive in patients treated with cryogenine and should therefore be regarded as of much less significance than the diazo reaction

BARGHOFF, ROBT S. Intestinal Tuberculosis
Annals of Int Medicine, Vol 2, No 9, p 59

Intestinal tuberculosis occurs in probably 50% of all cases of far advanced pulmonary tuberculosis. The pathology consists of the tubercle which in this case is prone to early ulceration. The bacilli may, however, pass through the wall of the gut without leaving a trace and involve the mesenteric lymph nodes. The regions most frequently involved are the ileum, cecum, and ascending colon—the so-called "sluggish areas." These areas are also the most absorptive regions of the gut which may explain why the bacilli are more prone to gain admittance

Symptoms are often amazingly meager especially in the incipency. Some of the most constant are 1 Alternating constipation and diarrhea 2 Abdominal pain which may be colicky or diffuse and

general, with tenderness over the right lower quadrant 3 Stomach symptoms such as absolute loss of appetite, aversion to food, and nausea Vomiting is infrequent 4 The resulting emaciation and cachexia 5 Nocturnal diarrhea is probably more constant than in any other disease 6 The temperature is not specific except in periods of severe ulceration when it is likely to be extremely high

Perforation of the bowel is rare because of the thickening of the intestinal wall by granulation tissue. Stenosis of the intestine with obstruction is not infrequent. Involvement of the mesenteric nodes and of the peritoneum is frequent

Treatment consists of general and local rest. The patient should have absolute bed rest 24 hours daily. Local rest or retarded peristalsis is obtained with a bland, non-irritating diet, hot compresses to the abdomen, occasionally hot bland or starch enemas, and by drugs such as atropine sulphate (1-200 grain), bismuth subnitrate in 30 grain doses, calcium carbonate and phosphate in doses of each 30 grains, and in the advanced cases opiates in the form of deodorized tincture of opium. X-ray and heliotherapy are recommended. Ultra-violet ray is preferred by the writer

ANDERSON, ALAN R. Electrocardiographic Studies in Artificial Pneumothorax and Thoracoplasty. Am Rev Tuberc. 20 728

Electrocardiograms made on 100 consecutive admissions to a tuberculosis sanatorium have shown very little deviation from the normal. Electrocardiographic studies were made on 50 patients with artificial pneumothorax and 8 cases with thoracoplasty. Neither the degree of pulmonary collapse maintained nor the duration of the collapse therapy had any definite relationship to the form of the electrocardiogram. Axis deviation of the heart occurred with right pneumothorax in 36 per cent of the cases

These studies would not indicate that any of the patients were afflicted with a degeneration of the cardiac muscle. The clinical data would appear to bear out this contention

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QUERIES AND ANSWERS



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Q Is there a limit to the size of a cavity that will heal spontaneously?

A Yes, such a cavity would probably be limited to a cm in diameter

Q Is there a tendency in a case with excessive cough and expectoration of aspirating some of the material into a remote portion of the lung?

A Yes, if a patient has a marked fluidity of the discharged material, a rapidity of the discharge, and an intensity of respiratory movement, etc., would tend toward the aspiration of infectious material into the remote portion of the lung with establishment of distant foci of infection

Q Is the epidemiology of tuberculosis a greater problem in the city than in the country?

A No It is a greater problem in the rural districts

Q How can the rural problem of tuberculosis be improved?

A By a thorough and complete survey of the open case and by the skin test in children, and by a survey of the milk supply. However, tuberculin testing provides the first means of epidemiologic diagnosis

Q Should the physician still urge sanatorium care in every case?

A Yes If, however, the patient desires to remain at home, or for financial reasons cannot enter a sanatorium, the patient should be instructed that after a minimal period of heroic treatment, progress has been unsatisfactory, the patient should be again urged to accept care in a sanatorium

Q Does the presence of cough always indicate the presence of pulmonary disease?

A No, not always Cough may be caused by inhalation of irritating gases or cold air, or excessive secretion. It must be remembered that the cough reflex most often originates, in the majority of cases, in extrapulmonary situations, such as, the larynx, the pharynx and nasal pharynx, the mediastinal glands, the stomach or ear

Q Is acute bronchitis essentially a primary disease?

A No It is quite often a secondary manifestation or a complication of other primary conditions

Q Has the number of tubercle bacilli in the sputum any bearing on the intensity of the bronchial ulceration?

A The larger the number possibly the greater or more acute the ulceration, but enormous masses may occur in favorable cases

Q Is the fluoroscope of great value in revealing slight lesions in the lungs?

A The fluoroscope is valuable for the study of movement both normal and pathological and as an aid in the treatment of artificial pneumothorax. It most always fails to reveal slight lesions which are plainly evident upon the roentgenogram.

Q A left thoracoplasty done five years ago has done very well with the exception of severe pain over the scar area. About three months ago this painful site began to swell. I opened a deep seated abscess which drained about four ounces of pus at the time, at the

same time air came through with the pus. About two inches above the abscess, on coughing, the skin bulges and through a pinpoint opening the air passes on coughing. I would like to know how often bronchial fistula follows thoracoplasty, also what is the theory of causation, also what is the proper treatment advised?

D K.

A It would seem valuable information to ascertain whether or not the sinuses communicate with the bronchi. This could be ascertained by the injection of lipiodol or other lipidized oil into the sinuses. A roentgenogram following the injection of the iodinated oil should give pertinent information. The patient would, of course, cough up the oil if the sinuses communicate with a bronchus. It is conceivable that the sinuses communicate with a localized empyema cavity only. In either event unroofing of the old abscessed cavity would be a procedure well worth consideration.

Q I have asked for and received several definitions of allergy. I would like your definition to compare with the varying (not various) ones I have

A Dorland's definition of allergy is "A condition of unusual or exaggerated specific susceptibility to a substance which is harmless in similar amounts for the majority of members of the same species." The inference in this definition is that specific susceptibility to a given substance is not allergy until it is in the exaggerated or unusual state. Vaughn in his text book "Allergy" does not attempt a concrete definition of allergy, but explains that the sensitization of cells to protein matter is that phenomenon created by the different amino acids of the protein substance contacting the living cells. The cell attempts to digest or break up the amino acid compound into such component parts that it may absorb the amino acids of its election. To accomplish this the cell throws out a ferment capable of splitting up the amino acids the end result being the amino acids that are nutritious and amino acids that are poisonous. Those poisonous acids that are repellent to the cell are the ones that produce the sensitization reaction.

If I may be permitted to add to the variety of answers that have gone to the writer of the above question are I would say that allergy is a physiological reaction of the living cell to a given substance to date believed to be only protein substance. What we know clinically as the allergic phenomenon is the amplification of this physiologic reaction or supersensitive state of the cell. Whether the supersensitive state of the cell is an effort on the part of the cell to repel the specific protein compound or whether it is, as Vaughn points out, the reaction against certain poisonous amino acids split off of the original protein body, I cannot say.

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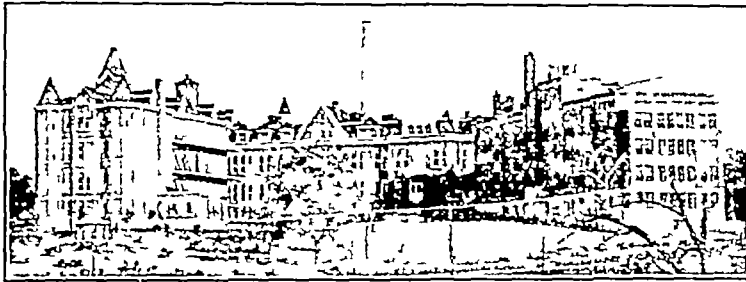
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(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"
 Lawrason Brown, M D

Editorial Comment

Important Points in Prognosis BY CONSIDERATION of the following points, a probable or doubtful valuation of the prognosis in individual cases of pulmonary tuberculosis may be made

Heredity The importance of this has been much over-estimated

Constitutional Factors An appraisal of these should be made

Mental Character A phlegmatic person has advantages over one of liable temperament. Psychic shocks may have a very unfavorable effect. The toxæmic condition due to tuberculosis may itself influence the patient's character.

The Patient's Age The effects of dissemination are better resisted by older than younger subjects.

Rapidity of Development of the tuberculous changes, and the results of physical examinations of the lungs.

Examination of Sputum Character and amount. The number and type of bacilli found.

The Vital Resistance May be estimated by careful observation.

Röntgen Examination Extent of lung markings. The smallness of the heart and main arteries, etc.

General Nutrition General appearance, obvious wasting, etc.

Blood Pressure A systolic blood pressure of below 100 mm Hg in men and 90 mm Hg in women is unfavorable, though the blood pressure may of course, in

some cases, be favorably influenced by treatment.

Hæmoptysis The danger of this may be increased by narcotics.

The Urine A Diazo reaction may disappear under treatment.

Complications Enlargement of the liver, diarrhea of various causes, anal fistula, thyroid enlargement (possibly a favorable symptom), amyloidosis (the appearance of the tongue may be suggestive in that respect), and laryngeal tuberculosis.

Signs of vagotonic or sympathico-tonic tendency

Pyrexia And various other toxic signs.

Data furnished by modern clinical laboratory examinations

The Influence of other diseases such as syphilis and diabetes mellitus. C M H

The Incidence of Intestinal Tuberculosis RECENT REPORTS on autopsies on patients who had pulmonary tuberculosis furnish the information that lesions in the intestines are not uncommon. In fact, some have reported finding evidence of the trouble in 60% of the cases autopsied. This, of course, does not mean that such a large percent of those having pulmonary tuberculosis suffer with the disease in the intestines, but it does mean that this complication is often unrecognized and, consequently, untreated.

Many times a diagnosis of this condition is delayed for the reason that we

wait for the two most common symptoms, namely abdominal pain and diarrhea. These are the symptoms of an advanced stage of the disease. We should at least look with suspicion upon such early symptoms as aversion to food, the frequency of intestinal flatus, mild attacks of nausea, and the uncomfortably "sick feeling" of which many patients complain, but cannot clearly describe.

R B H

Laryngeal Tuberculosis EARLY DIAGNOSIS is essential to the successful treatment of this disease.

Routine laryngologic examinations should be made in every case of pulmonary tuberculosis, since tuberculosis of the larynx is a common complication. This condition has not received the attention that it deserves because of the prevalent idea among general practitioners that little or nothing can be done to relieve the condition. In all cases of chronic laryngitis which do not respond readily to the removal of the etiologic factor, such as sinus infection or mis-use of the voice, a careful study should be made to exclude pulmonary tuberculosis.

Patients with a definitely diagnosed case of tuberculosis of the larynx are best handled in a sanatorium for tuberculosis, where they are under constant observation. A disease of the larynx superimposed on a severe pulmonary infection should be accepted as tuberculosis of the larynx until proved otherwise.

C M H

Our Crusade THE REAL CRUSADE against tuberculosis, conceived in recent years as pivoting on the question of the open case, must be conceded to be a most tremendous force in the control of the disease. The crusade which aims at the breaking of contact between the tuberculous individual and the child, must be regarded as most efficacious. Unfortunately, in most communities, this campaign is not yet pursued with sufficient energy or consistency. The pursuance of this policy will necessarily test the tact, efficiency and humanitarian insight of the

officers of any state, county or municipal institution. The fulfillment of this policy, however, from the standpoint of efficiency in the prevention of infection is worth every effort and every sacrifice.

The contact program in every tuberculosis institution, especially state controlled, should receive minute and detailed attention. Other things being equal, our future campaign must give the open case, in contact with children, preference as regards sanatorium admission. There can be no other procedure countenanced in public institutions.

C M H

In Considering the Death Rate IN THE consideration of the rather sharp decline in the death rate from tuberculosis, not only in the United States but throughout the world, there are many questions we should ask ourselves before claiming this or that movement responsible, viz:

How much credit must be given the normal cycles in the tuberculosis death rate? That there are cycles is proved beyond doubt.

How much credit must we give to the world war? The great increase during the world war of the mortality rate throughout the world must be construed as an increase in the number of deaths of individuals already suffering from tuberculosis. Privation, lack of care, mental anguish during the period of the war, no doubt brought about this increase in the number of deaths, as a consequence, the elimination of these individuals would tend to decrease the death rate on the restoration of normal conditions.

How much credit must be given the tuberculosis crusade? Here we must recognize the good that has been attained by segregation of open cases, the publicity given hygiene, etc.

How much credit must be given to the better standard of living?

How much credit must be given to the complicated process of immunity?

How much credit must be given to the higher standard of education?

How much credit must be given to certain methods of treatment that have prolonged the lives of tuberculous individuals?

How much credit must be attributed to the world-wide establishment of sanatoria?

How much credit must be given the great influenza epidemic that carried off great numbers of tuberculous individuals, as well as individuals who were either predisposed or had they lived inevitably would have become tuberculous?

At the present time one can truly say that the combination of the above factors has brought about this decline. It is impossible to evaluate each individual factor mentioned, however, it is the opinion of many that the outstanding factors are as follows: the cycle, the world war, the influenza epidemic, and increased efforts toward the segregation of the open case.

C M H

Great Events and Medical Progress GREAT EVENTS in history are proved to be landmarks in the progress of medicine and civilization.

The Crusades brought to western Europe Arabic pharmacy, which influenced a great change in the treatment of diseases. So important became the pharmaceuticals of the Orient at that time that men were driven to seek cheaper methods of transportation and set out in ships to seek short routes to the Orient. As a result Columbus discovered America.

When Constantinople fell western Europe was again blessed, because the great scholars of that city fled to western Europe and their influence for good gave a new stimulus to greater progress of medicine.

Following the invention of the printing press, self-education began, and independent thought soon laid the basis for scientific medicine.

The World War brought about great progress in surgery, the most notable of which, the last division of surgery, thoracic surgery, has been created. Prior to the World War, surgical operations on the

thorax, with a few notable exceptions, were confined to resection of the ribs, artificial pneumothorax, or the occasional successful suture of the heart muscles following a knife wound. The great number of chest injuries and the wide prevalence of empyema following the pneumonia prevailing during the period of the war made it possible and desirable to perfect means by which these conditions could be met. Rapid and brilliant have been the achievements in this field, so that at present the medical man has at his disposal the surgical relief of chest conditions which formerly were primarily medical problems.

The progress of chest surgery has become so great that the thorax is now as accessible to the surgeon as the abdomen.

C M H

Prognosis of Cavities THE PROGNOSIS of cavities not given suitable therapy

is very bad indeed. Eighty per cent of such patients will succumb within three or four years. The majority of cavities continue to get larger by appositional growth, caseation and softening of the wall of granulation. The danger is that of dissemination, throughout the adjacent or remote parts of the lung, by aspiration. Another great danger is that of hemorrhage, fatal bleeding is much more frequent than supposed. The spread of the tuberculous process to the larynx and intestine by inoculation is especially dangerous.

Collapse therapy is the only method of choice in treating cavities. It should not be undertaken without a precise anatomic diagnosis. Of greatest importance is the condition of the sounder lung, especially the finding of small foci of disintegration. The situation of the cavity is of great importance if thoracoplasty is contemplated.

Spontaneous cure of cavities is limited to early cavities and occurs only rarely. Collapse therapy, it is estimated, will cure early cavities in about seventy per cent of the cases and in about fifty per cent of the older cavities.

C M H

Papworth Village Settlement;* Its History and Aims

I FEEL very privileged to be asked to write an article on Papworth Village Settlement for DISEASES OF THE CHEST For

BY
SIR PENDRILL VARRIER-JONES
F R C P

Cambridge, England

many years I was a voice crying in the wilderness, and it seemed that few heard, and still fewer wanted to hear. It is therefore a particular pleasure to contribute to such a magazine as this.

Papworth is simply an expression of medical thought in material form. We have for years told consumptives what to do after leaving the sanatorium. At Papworth we have gone a little further. We have enabled them to do it.

In Great Britain there is no such thing as a *light* open-air job. Most open-air jobs are heavy, and such light jobs as there are anywhere usually mean a light pay envelope. Light pay envelopes mean a low standard of living, and a low standard of living means disaster for the patient and danger for his family and all his "contacts."

It seemed to me, in 1914, that it was absurd to tell patients to obtain work which did not exist and to live in conditions far beyond their means, and it then occurred to me that no progress would be made unless and until suitable work and conditions were provided. If the advice I tendered was sound, it ought to be carried out, and, if carried out, it ought to produce highly satisfactory results.

In 1914, therefore, I began with one patient. Others came into the scheme, and in time workshops were built and arrangements were made for suitable patients, after sanatorium treatment was over, to find permanent paid employment in industries of their own creation.

In 1918 we purchased Papworth Hall and its grounds. At that time we had 25 patients, living in the Hall itself. As their active treatment concluded, some decided

to take the chance offered to them and to live and work in Papworth's new industries. In that year we sold goods worth \$1,-

950 and paid wages amounting to \$845.

The scheme proved popular. It grew. As it increased in scale more and more patients were admitted to the hospital section for treatment, and more ex-patients became "settlers," i.e., brought their families to live at Papworth and took jobs in the Industries.

By the end of 1927 we had 200 beds available for patients under treatment, and we had admitted women to the benefits of the scheme. The industries by this time were paying nearly \$90,000 in wages, and selling some \$230,000 of goods each year without any appreciable loss, and the scheme began to attract attention. At first people were surprised to find that consumptives were willing to settle in a "colony." Then they were affronted at the idea of the families being "settled" too, not realizing that the family is the unit with which—for obvious economic and sociological reasons—any comprehensive anti-tuberculosis scheme must deal. We were told on good authority that the children born in the village would die, almost at birth, from tuberculous meningitis, and we were also told by other authorities that they would live until they grew up and left Papworth, but would then be stricken down at once by the disease. The truth is that neither disaster occurs. The children simply do not get tuberculosis, whether they stay at Papworth, or leave. Why is this? Surely because, living as they do with a "settler" who is a "middle" case and therefore from time to time a source of infection, they get small doses which are not enough to cause disease since (a) resistance is high, thanks to good food and healthy conditions, and (b) the specially built cottage and the habit of keeping the windows

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open prevent mass doses. We cannot yet claim to have systematized immunity, but are we not, perhaps, providing some helpful indications?

Progress did not stop in 1927, though by that time we were receiving less advice than in our early years, and Papworth continued to grow though nothing like as fast as conditions required. All development is limited by two factors: the charitable income and the volume of sales. We have found that if we can obtain the capital free of charge the scheme supports itself, so long as the sales department can find a market for the goods manufactured. We can only get capital, *free*, by means of charity drives and we wish we had the benefit of your Christmas Seals, and we can only get sales by making the right goods and selling them at the right price.

At the end of 1934 our entire capital investment did not greatly exceed a million dollars and we had over 1,000 people in the village. Sales surpassed \$410,000 and wages totalled \$150,000. In a sense we were paying, in wages, just about 15% on our total capital and when it is remembered how much our employees would have drawn in unemployment and health benefit had we not employed them the cash value of Papworth can be approximately assessed.

In this calculation it must not be forgotten that our main capital investment is not in the industrial departments at all. It is in hospital buildings, laboratories, land, and, above all, houses. We have now three hospitals, with a surgical section for cases requiring thoracic surgery now being added, a sanatorium section composed of chalets, three hostels, and an Out-patient department for the care of the village population. We have accommodation for 446 patients, and a waiting list. In the industries we have eleven departments. We do our own building and printing, we keep poultry, we make travelling goods, furniture, and portable wooden buildings. We carry on a trade in upholstery and we write signs. In every case each department has grown up round a skilled ex-patient, and the

whole of the industries is managed by an ex-patient as well.

Such, very briefly is Papworth. Its aim is to become a really comprehensive and complete unit capable of benefiting any sufferer from any sort of chest disease, to provide both medical and surgical treatment, and to provide employment for those who, while not bedridden, are nevertheless too ill to stand the pace and strain of modern industry. Further, we recognize that we have almost if not quite unique opportunities for research for our system of permanent employment gives us the chance of observing cases and their contacts closely and continuously for years at a stretch.

In conclusion, may I suggest the main lines upon which our minds are now working? We believe that little or no further progress will be made in the conquest of tuberculosis by the old dispensary-sanatorium system, not because that system is wrong, but because it is incomplete. It does not attract early cases, because it provides so little "bait," in the form of cures, to encourage them to submit themselves for treatment. Two-thirds of the beds in British sanatoria are therefore filled by middle and advanced cases who are beyond cure and can hope only for quiescence, and so long as we content ourselves by producing quiescence in the sanatorium, and then returning patients to their homes armed only with advice which they cannot follow, we shall continue to frighten off suspects who might otherwise come forward early for treatment.

We believe, too, that prevention is better than cure. We suspect that pathology may have taught us all that it can, and that perhaps that teaching has not been of much real help. We are inclined to think that we ought to address ourselves to the study of the chemical changes which must precede tissue destruction, and to reduce diathesis to bio-chemical terms. May there not be some system by which one may assess the individual degree of resistance to various diseases, and ap-

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Intrapulmonary Infection of Bronchogenic Origin*

BRONCHOGENIC EXTENSION of intrapulmonary infection from one lung across to the other has

been observed frequently in the routine examination of roentgen films during my experiences at various hospitals. Such extension of infection from one lung, in which destruction of pulmonary tissue has taken place, gives rise to infection in the opposite lung and is no doubt an auto-genous infection, due apparently to the inhalation of infectious exudate and detritus, as it is most frequently observed in the presence of a breaking-down or cavitation of a caseous tuberculous lesion, though it may also occur from other intrapulmonary suppurations and destructive lesions.

The studies carried out in Krause's laboratories in Baltimore (1) have shown the presence in the walls of the larger bronchi of small nests or pockets of lymphatic tissue, covered only by a thin layer of bronchial mucosa. Krause believes that these islands of lymphatic tissue drain the bronchial mucosa, that tubercle bacilli which invade them are carried thence through lymphatic channels into the thoracic duct which in turn conveys them to the venous blood stream in the neck, whence they ultimately find lodgment in the pulmonary tissue by way of the pulmonary artery. It is quite conceivable that pyogenic organisms also find their way into these islands of lymphatic tissue, whence they, too, may reach the lung by way of the pulmonary artery. These small islands of lymphatic tissue may also be invaded by a more virulent organism which destroys the lymphatic tissue and the contiguous pulmonary tissue, resulting in suppuration and destruction. The destruction of these pockets of lymphatic tissue by a bronchogenic spread or extension of the infection could well result in multiple saccular dilatations of the

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bronchi or honeycombed cavitations

Whatever may be the part played by these islands of lymphatic tissue, there can be little doubt of the bronchogenic origin of intrapulmonary suppuration, as demonstrated by the important experimental work of Smith (2), Crowe (3), Scarff (4), Allen (5), Myerson (6), Van Allen (7), Hill (8), Miller (9), and others.

When the destructive lesion involves particularly the right upper lobe (fig 1), one would expect aspiration infection of the right lower lobe to precede bronchogenic cross-infection, as the bronchus to the right lower lobe is an almost direct continuation of the trachea. This type of secondary infection does occur, of course, quite frequently, usually in association with bronchogenic extension, but the infection is largely limited to the peribronchial tissue and those alveoli adjoining the bronchi. The secondary infection in this region does not as a rule involve the peripheral parenchyma to the extent that it is involved in bronchogenic cross-infection.

Bronchogenic extension in cross-infection may occur in any part of the opposite lung, but in reviewing a large series of roentgen films, made in the usual upright posteroanterior stereoscopic exposures, the area involved is between the second and

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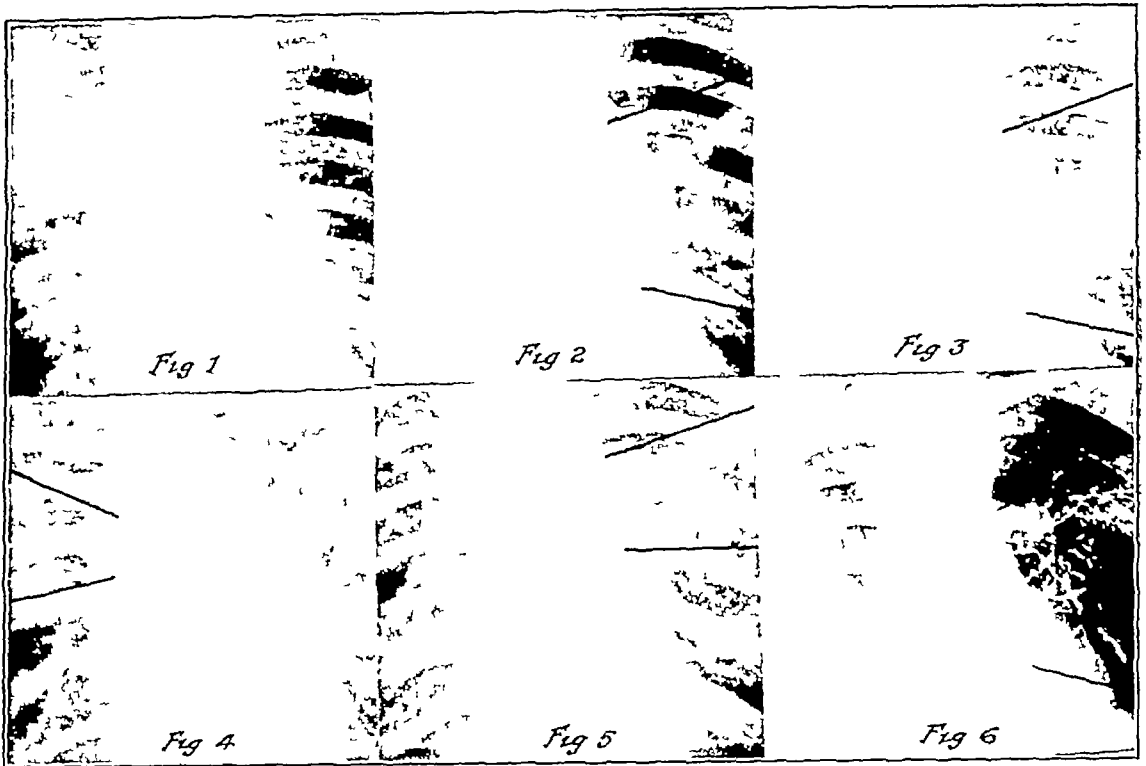


Fig 1, Case 1 Feb 28 1933 Diffuse infiltration with almost complete excavation of right upper lobe. At this time there is no secondary infection into the left lung.

Fig 2 Case 1 June 20, 1933 Partial collapse of right lung has been performed. At this time the area of bronchogenic cross infection was first recognized in the left lung. Note site of predilection opposite second to fourth ribs.

Fig 3, Case 1 Sept 1 1933 Shows progressive involvement of the right lung. At this time very extensive involvement of the left lung is seen still remaining in region of site of predilection.

Fig 4 Case 2 May 6 1930 Tuberculosis of left lung with presence of small cavitation. Bronchogenic extension

of infection is seen in the right lung opposite the second to fourth ribs.

Fig 5 Case 3 Nov 28, 1932 Tuberculosis of right upper lobe. Secondary or bronchogenic cross infection of the left lung. This condition is most frequently seen.

Fig 6 Case 4 April 2, 1930 Bronchial spill or artificially demonstrated site of predilection of intrapulmonary material from the right lung into the middle of the left lung by gravity. Patient lying on left side and lipiodol injected through drainage tubes into right chest. Through a bronchial fistula the lipiodol reached the main right bronchus gravitated around the bronchial bifurcation into left bronchus and out into the parenchymatous tissue opposite the second to fourth ribs.

fourth ribs. In the early stage there will usually be found a limited focus of infection somewhere in this area (fig 2), while later the entire area will be involved and extending out to the periphery (fig 3).

Most frequently the original infection is found in the right upper lobe and spreads to the left lung, but figure 4 shows an example of the original infection being in the left upper lobe with the bronchogenic secondary infection into the right lung, and the site of predilection being relatively the same.

In the ordinary type of subacute pulmonary tuberculosis of the adult the lung apices of both upper lobes are very frequently involved. The lesions in the two lungs may be relatively of the same age and distribution, or the lesion on one side may be very apparently of longer dura-

tion and more widespread than that on the opposite side.

When the lesions are of different ages it is generally impossible to determine whether the younger infection is exogenous or an example of autogenous bronchogenic extension. The usual conception has always been that these are examples of autogenous bronchogenic cross-infection.

In all the cases of destructive pulmonary lesions which the author has followed closely, cross-infection has always developed in the part of the lung fields projected between the second and fourth ribs on the roentgen films (fig 5). The evidence would, therefore, indicate that bronchogenic extension of infection to the apical region of the opposite lung is very unusual.

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Early Pulmonary Tuberculosis

WHEN WE READ statistics on the deaths due to tuberculosis, we are forced, in the words of Will Rogers, "to point with pride and view with alarm." It is a well-known fact that the deaths due to tuberculosis have been reduced greatly in the last thirty years. In the United States registration area in 1900 there were 182 deaths per 100,000 population due to pulmonary tuberculosis, in 1929 there were 68 per 100,000. We may justly point with pride at these figures but of greater importance is the fact that the majority of tuberculosis occurs in the age period 15 to 45, the period of a man's or woman's greatest economic value. In the registration area, more deaths between the ages of 15 and 35 were due to tuberculosis than to any other disease. Furthermore, it is estimated that there are more than 700,000 cases of active pulmonary tuberculosis in the United States today. Until we can reduce this devastating scourge of young adults, anything tending to help in its control should be given our attention and receive our most serious consideration.

It would be superfluous to go into detail regarding the necessity of early diagnosis but this is the most important single factor in saving these young adults from a long and serious illness and possible death. If we were able to diagnose properly and treat pulmonary tuberculosis in its early stages, our percentage of arrested cases and cures would grow tremendously. Mistakes in diagnosis on the part of the physician are responsible for all too few of these advanced cases. Many, many times the physician does not see the case until the disease is advanced. The onset has been insidious, the patient has not observed, or has not considered important, the early symptoms and has, therefore, not consulted his doctor until the disease has progressed beyond the

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minimal stage. There are numerous reasons why the patient himself is responsible for not getting his diagnosis made when his chances for cure are at the best, but the lay persons are being educated more and more about early symptoms of the disease through insurance companies' and pharmaceutical manufacturers' advertisements, syndicated health columns in daily papers, radio talks, Hygeia, etc. This is very valuable work along public health lines. It promises better health and increases longevity by making the patient more cognizant of the meaning of symptoms and causes him to have more frequent and earlier examinations. Still it is not enough, we, as physicians, must take our share of blame also.

Here lies the crux of the problem—how often and why do we overlook the presence of early pulmonary tuberculosis?

It has been said that a good syphilologist considers that everyone has syphilis until it has been disproven. Likewise, every doctor should consider the possibility of tuberculosis in all patients examined. Many diagnoses of pulmonary tuberculosis are missed because the attending physician was not suspecting nor forever looking for tuberculosis. The doctor doing general practice does not have occasion to see tuberculosis so often as the specialist in chest diseases. However, he should become equally "tuberculosis-minded," then an early case would be less likely to escape his notice. Therefore, our first plea is for the practitioners to keep the possibility of this disease always prominent in their minds.

The time-worn subject of history-taking may be relegated to our medical school days, but not until we have mentioned a truism, "one case of tuberculosis begets another." History of tuberculous contacts may often save serious blunders, and when such a history exists, tuberculosis must be considered always as a probability.

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The classical symptoms of early tuberculosis are familiar, but so few patients present themselves with these classical symptoms. It is the type without such symptoms which should receive our utmost care, lest an error be made.

We are all too prone to think of tuberculosis as a chronic, slowly progressive disease from its onset. We sometimes forget that it may start acutely, so acutely in fact that it may be mistaken for pneumonia. Indeed, it may start as pneumonia, tuberculous pneumonia, simulating a pneumococci disease, and any case of lobar pneumonia which lasts longer than one ordinarily expects should be studied to rule out the possibility of tuberculosis.

Probably the most deceptive type with which we have to deal is that one which begins acutely with chills, fever, aching, malaise, and is diagnosed influenza. In due time the acute symptoms subside, but the patient is not entirely well. In these cases, tuberculosis must be ruled out by every means at our disposal before that patient is dismissed as non-tuberculous. Well over 50% of all patients coming into the Southern Pacific Tuberculosis Sanitarium, give a history of influenza, from which they did not entirely recover, several months prior to the so-called onset of illness. We contend that they did not have influenza—they had pulmonary tuberculosis from the start and a diagnosis made at the onset would save many, many months of illness and would frequently save lives. Tuberculosis begins acutely as often as it begins insidiously and it should always be suspected in any acute, vague illness.

A patient with an unexplained pulmonary hemorrhage deserves everything in our diagnostic armamentarium to prove or disprove the presence of tuberculous lesion. Many patients have a hemorrhage very early. This often occurs before the history or physical signs will point to a pulmonary lesion. It is our firm conviction that any patient with a pulmonary hemorrhage should be considered as tuberculous. The burden of proof is on the person who feels that the hemorrhage was

not due to tuberculosis and, until such definite proof can be produced, we feel that it should invariably be assumed that it is tuberculosis and appropriate treatment be instituted immediately, even in the absence of other signs and symptoms of tuberculosis.

Keeping tuberculosis foremost in our minds, careful history-taking and careful physical examinations are not enough to avoid missing some of these early cases of pulmonary tuberculosis. Our laboratories must be used freely. They may prove a diagnosis in which physical signs are absent. Sputum, all sputum the patient raises, should be examined daily for many days before we may say the sputum does not contain tubercle bacilli. Even then we cannot say that the sputum is negative. When a positive sputum is suspected and has not been obtained by the usual methods, they may be found frequently by injecting the sputum into a guinea pig. If not found by these procedures, then, and only then, can a patient's sputum be said to contain no tubercle bacilli.

The greatest single agent in the diagnosis of early tuberculosis is the Roentgenogram. As compared to the importance of this film in detecting the presence of minimal lesions, the history, the physical signs and other laboratory procedures fade into relative insignificance. Physical signs may be absent or misleading and the diagnosis completely missed without X-ray examination. We admit that we have, on several occasions, had patients with all evidence of pulmonary tuberculosis, including hemorrhage and positive sputum, examinations of whose chests revealed no abnormalities, but whose lesions were found unmistakably on the X-ray film. Hence, we know that the diagnosis of tuberculosis can and will be overlooked often if we depend on physical signs without the aid of the X-ray. When, and only when, we have wider and more extensive use of the Roentgen-ray in patients in whom we have even the least reason to suspect tuberculosis, we

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Silicosis and Tuberculo-Silicosis*

THE DISEASE, Silicosis, is not particularly new as Paracelsus as early as 1534 published his work,

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entitled "Miner's Diseases" Denker provided the anatomical and Kussmaul the chemical proof of the deposit of inhaled dust, especially silica in the lung. The name pneumoconiosis was invented by Denker, who described in detail the anatomical picture of the dusty lung.

In the early study of silicosis along the Witwatersrand gold fields in South Africa, it brought to light the interesting fact that the majority of miners affected were rock drill workers. The same holds true today whether the mining be gold or otherwise, as the dust exposure is here very excessive. During the period around 1900 ventilation in the mines was very inadequate and the men were working in high temperatures and in relatively high humidity. Dry mining was carried on extensively and at that time the necessity of wet mining was not sufficiently impressed upon the minds of the ultra-conservative miner, and these individuals disliked any innovations in the traditional ways of work, with the result that any suggestion attempting to minimize this occupational danger brought forth only a half-hearted response on their part.

Etiology

Phthisis-producing dust concerns us mainly, and this must possess certain definite characteristics. It must be capable of overcoming the lung's reactive ability to rid itself of a foreign body, and it must remain arrested within the alveoli over a great enough period, and must be relatively indestructible to tissue and tissue juices. Dust becomes arrested by phagocytosis and one must presume that dust particles approximate the size of the common pathogenic micro-organism.

Mavrogordata (1) points out that phthisis-producing dust is inert—that it fails

to produce like cells that take it up through phagocytosis, and that it fails to provoke exudation. An irritant that produces much expectoration is not retained long within the normal lung. The dust which we are most interested in is the one producing simple silicosis and later tuberculo-silicosis, and the offending agent is silicon dioxide (SiO_2). Haldane, many years ago, suggested the possibility that silica which is productive of dust phthisis is often associated with other dusts, which act as an antidote. Certain industries in which silica is present in comparatively large quantities fail to produce simple silicosis—while in others fibrosis begins after relatively short exposure. The problem of dust antidote is receiving considerable attention by those interested in the silicosis problem.

Clinically, there is a factor related to etiology which is unequivocally a dominant one but its explanation upon a physiologic basis is as yet obscure. That is, the super-imposition of an inter-current infection in cases which have remained in a latent stage, oftentimes spells ruin. How these phagocytic cells laden with silica can so obscure themselves until their media is changed through infection has yet to be brought to light.

Mavrogordata is inclined to the view that these cells remain in the lymph of obstructed lymphatics, and lymph will remain as fluid for a long period in stagnant obstructed areas. The progression of disease to exitus in some of my own cases following infections, some of a non-tuberculous nature, were too rapid for comfort.

Pathology

In the development of simple silicosis Strachan and Simpson (2) point out the course of inhaled dust, and their contribution is most noteworthy. Fifty percent of all dust inhaled remains in the nasal mucous membrane. A certain proportion reaches the bronchi and then the ciliated epithelium will wave a great portion of

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this up until it reaches the larynx, and then it is either swallowed or expectorated. Only 4 to 24 per cent of the dust inhaled actually reaches the lung. Deposition of dust upon reaching the lungs, occurs in certain definite sites, and these correspond to the lymphatic arrangement. For our purpose we can consider the pulmonary lymphatic system to consist of a superficial and deep network which is inter-communicating and which empties into either broncho-pulmonary, superior or inferior tracheo-bronchial or para-tracheal glands. Furthermore, lymphoid aggregations occur throughout the lung in the sites of the sub-pleural, peri-bronchial, peri-arterial, and peri-venous systems. Early pigmentation will show in the glands, sub-pleural tissue and inter-lobular septa.

Defensive mechanism which attempts to limit the invasion of dust, is the nose and naso-pharynx, reinforced by the ciliated epithelium in the upper respiratory tract. An upper respiratory infection which provokes desquamation of the epithelium removes the greatest obstruction to the particulate matter. When dust reaches the alveoli it produces a proliferation of the lining epithelial cells, which become detached from the walls to form the alveolar phagocytes. The phagocytes or dust cells tend to accumulate in smaller air passages such as the smaller bronchioles, and these pass into the lymphoid aggregates. With the arrest of the phagocytes in the pulmonary lymphoid structure, there is then a disintegration of the dust cells which acts as an irritant, producing a lymphoid hyperplasia, also the fibro-blastic phenomena which characterizes silicosis. Silicotic nodule is now the next stage and this is formed by concentric deposits of fibroblasts occurring at the periphery around pigmented cells.

Infective silicosis implies in practically all cases superimposed tuberculosis. In the main, our discussion will be confined to this angle as the tubercle bacillus is by far the most important organism which modifies silicosis. In the infective type there is a coalescence of the lym-

phoid islets, foci of caseation appear, which is not present in simple silicosis, and the nodules in the lung take on a greyish appearance—quite a contrast to the blackish nodules of the simple type.

We are most prone to encounter the silicotic problem in the following occupations. Heading the list, of course, is mining, and this will comprise gold, silver, lead, zinc, copper and the anthracite and bituminous coal mining. (2) Quarrying. (3) Stone finishers. (4) Pottery workers. (5) Glass workers, also those workers which engage in spray coating and construction work, such as railways, highways, etc. Of course there are many subdivisions under the above headings, but I feel it is unnecessary to go more into detail.

History of the Case

The typical history of the average case is that it begins as "dust fibrosis" and ends as "dust phthisis." Without dust there would be no silicosis and without the siliceous particles the predisposition of tuberculosis would not be present and silicosis would not be the gravely disabling disease that we now know.

It begins very insidiously and is practically always progressive, but during the early years of its progression it is not incapacitating and the individual enjoys his normal state of health. After the pre-silicotic stage has been passed, and the severity of the process increases, then we attain symptomatology which lessens physical activity.

If the individual affected is the deep-chested, broad-shouldered type of person, the progress of the disease is considerably slower and his tolerance is much greater than the phthinoid type with the flat chest. In the latter the infective process makes inroads a great deal more rapidly, and having less respiratory and constitutional reserve does not stand it so well. We should think of silicosis only as a disease in which the latent tuberculous element plays a large part. The after history of these cases is quite significant. The outlook of the individual is mainly dependent upon his ability to keep the in-

fective agent "bottled up" and inactive. Or, on the other hand, if it becomes active or an infection occurs from without the lung, it may spell exitus. According to Flasei, the actuarial adviser of the Union government of South Africa, the duration of life of the silicotic individual is 13.66 years. The anti-primary stage usually lasts about four years. Primary to secondary stage continues for about four and one-half years. The secondary stage until finality is reached usually comprises from five to six years. These figures indicate very clearly the inherent progressive tendency in most cases of silicosis. In the white individual, longevity should be appreciably greater, and we must recall these statistics are taken from a group of men, the majority of whom are South African natives, whose resistance in combating tuberculosis is very low indeed. Seventy per cent of all deaths in silicosis can be attributed to tuberculosis.

General Findings of Simple Silicosis

There are certain cases which finally reach death and no evidence of tuberculosis can be ascertained, and it is assumed that these cases are purely the result of simple silicosis.

The usual symptom, clinically, of silicosis in its earliest detectable stage is the dry, irritating, non-productive cough, worse in the morning and occasionally accompanied by vomiting. Respiratory disability is practically negligible at this time. There is a marked reduction in entry. There is also a characteristic alteration in the normal vesicular type of breathing, to a harsher type due to the predominance of scar tissue. The silicotic chest in the absence of a complicating infection is practically always a dry chest, and an aid to diagnosis is not what you find, but the absence of findings.

In the beginning, the apical zones are less affected than other portions of the lungs, but toward the later stages the lung in its entirety is involved. In an early silicotic stage when the indurative phenomena become a bit marked, it shows as an enlargement and mottling of the hilar shadow, thickening of the trunk

shadows proceeding from the hilus to the border of the lung, and considerable arborization, representing a huge network. With the development of the disease the mottling will spread over the lung, oftentimes in a symmetrical manner. Occurring at this time there is a loss of elasticity in the lung, decrease in vital capacity, and dyspnoea may be present.

Breath sounds in the apices are greatly harshened, through the huge cicatrization, and the lower portions of the lungs show an emphysema. Expectoration is often absent, and rales may only be occasionally found, and this feature makes it a difficult problem, and again portrays the value of Roentgen ray. Normal temperature is often a concomitant feature, even though exitus is only around the corner. Cardiac insufficiency with stasis of the pulmonary and general circulation is the end result.

Tuberculo-Silicosis

Grafting tuberculosis upon a silicotic base we find then a coalescence of the fibrotic nodules, a preference for the apical zones, and asymmetry of the thickening processes, cavernous destruction, and a small vertical heart. Clinically, the appearance of all the toxic symptoms of tuberculosis, increase of rales, and also acceleration in the sedimentation test. In certain mines simple silicosis will rapidly pass to the infective type, especially if wet methods have been adopted, and the miners are working in high temperature and relatively high humidity. This naturally predisposes to the development of pathogenic micro-organisms.

I doubt the possibility that such a disease exists as simple silicosis. Realizing that the enormous percentage of deaths in these cases are due to tuberculosis, we are undoubtedly dealing with a condition in which a pre-tuberculosis base is the predisposing factor. Furthermore, I doubt that silicosis would ever develop without this pre-tuberculous base. Simpson and Strachan (3) have recently taken a number of cases of so-called simple silicosis uncomplicated, and by injecting the contents of the silicotic nodule into the group

of guinea pigs, found that a large proportion of pigs succumb to tuberculosis. Even in its earliest detectable stage there must exist a low grade or latent form of tuberculous infection, even though a clinical demonstrable basis is not evident.

Schneeberg Lung Disease

If you will pardon the digression, there is a disease associated with silicosis which has small practical value, because of its limited occurrence in a localized area, and that is the Schneeberg lung disease. Along the borders of Saxony and Bohemia, cobalt and bismuth are mined and these contain a content of arsenic and radium. Developing upon a pneumoconiotic base, pulmonary carcinoma is met with in one half of all the old miners—a combination of dust fibrosis and cancer of the lungs. Ore containing a content of radium may be productive of pulmonary cancer and workers should bear this in mind.

Radiographic Appearance

A radiograph of high quality gives us the most reliable single diagnostic criterion. A typical case of moderate degree silicosis will show oftentimes symmetrical mottling of the lung fields, and when this does occur it is almost specific. The first definite evidence of silicosis from the radiograph is the increased fibrosis extending outward from the hilum of the lung, and more or less resembles the leafless tree, as mottling evidences itself, the tree takes on leaves, and this is represented by arborization.

Regulative Measures

1. Regulative measures as advocated at present by most mining engineers.

- (1) Adequate standardization of ventilation in mines which produce dust phthisis,
- (2) Regulate the method and times of blasting.

In choosing applicants for this type of work an initial examination is absolutely necessary, and the flat-chested phthisioid type should be eliminated.

Periodic examination should be given every six months and this should include

not only a physical but a radiograph as well.

Treatment

Unfortunately, the rehabilitation program has been far from satisfactory. As soon as the presilicotic stage has been diagnosed, the men have been removed from underground work, but remembering the progressive tendency of this disease, this is not sufficient. It is my contention that all of these cases, whether they are in the presilicotic stage, primary stage, or later, they should all be hospitalized and given a period of treatment comparable to tuberculosis since the pre-tuberculous base must not be lost sight of. In my own work, which is largely referred, I am not fortunate enough to get early cases, and a majority of mine are the advanced tuberculo-silicotic individuals.

To recapitulate allow me to state:

(1) Silicosis apparently has an anatomical basis, as it develops on the site occupied by lymphoid tissue.

(2) First evidence of silicosis is bronchiolitis.

(3) Silicosis is a fibro-blastic phenomenon followed by a dense fibrosis of a nodular type.

(4) Massive fibrosis may develop in an uncomplicated silicosis.

(5) Infection modifies silicosis in the direction of excessive fibrosis.

(6) Tuberculosis is the main infective factor.

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Warfare and Plagues WARFARE, LIKE PLAGUES, IS intermittent. There may be decades, or even centuries, practically devoid of calamity, in the case of tuberculosis, though there may be cycles, the devastation is never ended. From the dawn of history and beyond, the *white plague* has consistently and unemittingly fulfilled its destructive destiny. Hippocrates, in four hundred B. C., described tuberculosis as the most consistently destructive disease.

C M H

Immunological Response to Different Proteins of the Tubercle Bacillus

THE VIOLENT skin reaction produced by extremely small doses of the proteins and protein derivatives, which are the principal active components of Old Tuberculin, is proof that powerful immunological forces are at work here. It is the more surprising to learn that this same protein cannot cause the formation of antibodies, nor can it make normal individuals hypersensitive. Intact dead bacilli, on the other hand, can be the cause of hypersensitiveness.

Some have sought the reason for this difference between tubercle bacilli and tubercle protein in the time factor. A considerable amount of ingenuity has been spent on devices to imitate the slow diffusion of tubercle protein supposed to occur around the tubercle bacillus, but without causing hypersensitiveness.**

Others believe that the anatomical tubercle plays an important part in the production of hypersensitiveness. While it is true that we never find hypersensitiveness without tubercle, we often find tubercle without hypersensitiveness, e g., in the case of foreign body tubercle. It is possible that contact between a tubercle and tubercle protein is necessary for the production of hypersensitiveness. All efforts to accomplish this contact by introducing tubercle protein into foreign body tubercles by various means, were unsuccessful in producing hypersensitiveness.

A third possibility is the presence in the tubercle bacillus of an unknown substance which is the cause of hypersensitiveness. What do we know of the nature of this hypothetical compound? In the first place, we know that it must be insoluble in water, alcohol and ether. After a hundred extractions with each of these solvents we obtain a powder that is still very active in producing hypersensitive-

BY
C H BOISSEVAIN, M D *
Denver, Colorado

ness. In the second place, we know that it is destroyed by boiling with dilute acids, by treatment with alkali or by prolonged grinding in a ball mill. In the third place, we know that soluble tubercle protein and carbohydrates are the products of its hydrolysis. After prolonged grinding we observe decomposition in soluble proteins and a polysaccharide. This is the specific polysaccharide which has been isolated from the tubercle bacillus on numerous occasions, and which precipitates antiserum in a dilution of 1/100,000 †

We now obtain the following picture of the active part of the tubercle bacillus. It constitutes about 70 percent of the intact bacillus, and is an insoluble combination of water-soluble tubercle protein (the active part of O T) and specific polysaccharide. Each of the two components is a partial antigen. The soluble protein can provoke a skin reaction in a hypersensitive individual, but cannot itself cause hypersensitiveness. The polysaccharide can precipitate a suitable antiserum, but cannot itself cause the formation of antibodies. The combination of these two partial antigens forms the complete antigen, which can provoke a skin reaction, but also causes hypersensitiveness, it can precipitate antiserum but it also stimulates the formation of antibodies.

If we inject an emulsion of the powder obtained by successively grinding and extracting tubercle bacilli into experimental animals, we obtain a serum that agglutinates defatted tubercle bacilli in dilution 1/200 and also gives a precipitate with the specific polysaccharide. Animals injected with any of the numerous kinds of tubercle protein show no formation of agglutinin. After injection of dead bacilli

*Colorado Foundation for Research in Tuberculosis, Colorado Springs, Colo.

**A slight degree of hypersensitiveness is sometimes produced by the use of enormous doses of soluble protein.

†Boissevain, American Review of Tuberculosis 1925 Vol XXX 547

(Continued to page 22)

Resistance and Tuberculosis

WHEN THE tubercle bacillus invades the respiratory tract in children a primary lesion or Ghon tubercle results. This primary lesion consists of a small circumscribed pneumonic tuberculous process, which may be located anywhere in the lung fields, but is most commonly found in the lower lobes. This Ghon tubercle is the primary lung focus. Next, an associated lymphangitis develops and then the adjacent tracheo-bronchial glands become involved.

The Ghon tubercle tends to spontaneously disappear completely, or become calcified as do the lymphatic glands. Chest signs and symptoms are usually absent, and the primary infection is rarely detected clinically. The bacilli are not walled off as securely as was formerly thought in the calcified tubercle. By absorption of the calcium, the bacilli are occasionally liberated into the blood stream, producing milary tuberculosis. This primary infection, or Ghon tubercle, causes the body to become acutely sensitized to further infection with tubercle bacilli. This acute sensitization to a protein resulting in inflammation is known as allergy.

Hayfever, asthma and migraine headaches are almost synonymous with allergy. In hayfever, it is usually a sensitization to the pollen protein of plants, in hives, to foodstuffs, such as eggs and strawberries, in asthma and migraine to the protein of many kinds of substances.

The tuberculin reaction is caused by allergy. The Von Pirquet, Mantoux and other tuberculin tests give a positive reaction when a primary infection or Ghon tubercle is present.

There come periods in the individual's life when allergy or the acquired tissue resistance and hyper-sensitivity is lost temporarily. At this time Von Pirquet, Mantoux and other tuberculin tests react negatively. This loss of allergy, or anergy, as it is called, is brought on by overwork, puberty, pregnancy, the menopause, mea-

BY
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sles, whooping cough, and other conditions which cause bodily reserve depletion. Anergy has been given

as the cause for the high mortality rate of adolescent girls, but the most recent work seems to prove this observation wrong, and anergy may prove to be very desirable in an individual. A positive tuberculin reaction points to infection and the degree of reaction is usually a measure of the severity of the infection. This allergic reaction of the body to the tubercle bacillus, brought about by the primary infection, is now thought to be detrimental rather than desirable. Avoidance of infection is again the most desirable, and the most recent evidence adduced shows that the lack of infection does not predispose to the acute fulminating type of lesion, "galloping consumption." In fact, just the opposite prevails, and allergy is now considered a dangerous element in tuberculosis.

Immunity may be described as a condition which causes certain individuals to escape from tuberculosis even though exposed.

This immunity may be congenital, or due to individual or hereditary peculiarities, or it may be acquired—that is, changes produced in the system by a previous attack of tuberculosis, or by vaccination, or inoculation, as in the BCG procedure.

Resistance is the ability to ward off, and overcome, the encroachment and effects of the tubercle bacilli. Recovery from tuberculosis depends upon the natural resistance and not immunity. The tuberculin reaction is caused by allergy and gives no measure of immunity.

While it is true that one may exhibit a resistance to a disease and yet be immune to it, in tuberculosis common usage has made the terms immunity and resistance practically synonymous. They are used to express the ability of the individual to fight and overcome the tubercle

bacillus Resistance differs with each individual

During the past twenty-five years the subject of resistance and immunity has received much attention. The literature on this subject is voluminous, with the result that a confusion has arisen through which it is difficult to see light. Just what it is that is active in killing the bacilli in the body, or rendering them harmless is not yet known. We do know however, that resistance is not a man-made thing. We either have it, or we don't have it. It is true that immunity to tuberculosis may be acquired when we become infected with tubercle bacilli, but we have not yet learned how to give a greater amount of resistance to one who has not enough to win his fight for life against tuberculosis.

We attempt to increase resistance by one of three methods

- 1 By injecting virulent tubercle bacilli
- 2 By injecting avirulent tubercle bacilli
- 3 By injecting dead bacilli

It is generally admitted that the use of *virulent* tubercle bacilli is too risky, and that the injection of tuberculin or *dead bacilli* does not give adequate protection. At present, the injection of the killed human bacilli is again being experimented with at Johns Hopkins, and Saranac Lake, and the evidence so far concurs in the belief that the injection of dead bacilli is not satisfactory. Although Soper reports better results with heat-killed S bacilli than with B C G.

An attempt to produce immunity by using *avirulent* bacilli is receiving the most attention at the present time and a great deal of work has been done with Bacilli-Calmette-Guerin (bovine tubercle bacilli, isolated from a heifer in 1905 by Calmette, and attenuated by 16 years' culture on a bile potato medium). The vaccination of infants with this organism began in 1921. This treatment originally consisted of giving approximately three hundred millions of highly attenuated living tubercle bacilli to new-born babies, in

the milk feeding, on the third, fifth, and seventh day after birth. At this time the intestine of the new-born is extremely permeable for microbic germs. The advocates of this form of treatment claim that such vaccination protects those in a tuberculous environment from graver infections.

This procedure has been employed so extensively that the injection of B C G bacilli into infants exposed to tuberculous infection can not be considered harmful. That it is beneficial and more helpful than any other agent has not yet been proven.

There is first the questionable safety of prophylactic immunization against tuberculosis by the use of a living organism. A repetition of the unfortunate Lubeck disaster lies within the realm of possibility. The organisms may again become pathogenic. Second, it is claimed by some, that the safer use of dead tubercle bacilli can accomplish as much as Bacilli-Calmette-Guerin. Dr. Calmette of Paris originated this procedure, and France has given its endorsement through the prestige of the Pasteur Institute.

It is impossible in this short article to deal with the tremendous amount of literature already existing. The progress and development of this subject, however, must receive the unbiased attention of all interested in the prevention of tuberculosis. Myers claims that our dangers from tuberculosis really begin when allergy makes its appearance, and they last as long as allergy is present. We can not plant cultures of tubercle bacilli in the bodies of infants without producing allergy.

The value and the limitations of B C G are still to be determined, and it is too early to give an accurate appraisal of this method. We do know that recovery from tuberculosis depends upon the natural resistance and not immunity. Just what it is that comprises resistance, we do not know.

We know that the tuberculin reaction is caused by allergy and gives no measure of immunity, that allergy is dangerous and undesirable, that personal disaster as malnutrition, disease, over work and over

play, all lower the resistance of the natural barriers to infection

So, until we are given a direct method of *creating* resistance, our efforts in the

sanatorium treatment of tuberculosis are directed towards *conserving* and *expending judiciously* whatever resistance the patient is fortunate enough to possess

PAPWORTH VILLAGE SETTLEMENT; ITS HISTORY AND AIMS

(Continued from page 9)

ply preventive measures long before that resistance has failed? We wait, now, until the invading bacilli have produced symptoms serious enough not only to alarm us, but to alarm our patients, for it is only after the layman detects disease that his physician is called in. This fact, obvious though it be, is often forgotten, but it should be remembered that again and again, especially in tuberculosis, physicians fail simply because they do not see the case in time. We are, as a profession, suffering because we are dependent upon

lay diagnosis of symptoms. Can we not alter that? Can we not study the beginnings of disease, as we are now trying to do at Papworth, so that we may gain knowledge of the first signs of disequilibrium and disfunction? I believe that, if once we gain that knowledge, we shall revolutionize the practice of medicine.

Now we say to our lay brethren "Come to us, and we will cure you, if we know how." Before long I hope we may be able to say "Come to us, and we will *keep you well*."

INTRAPULMONARY INFECTION OF BRONCHOGENIC ORIGIN

(Continued from page 11)

The question very naturally arises as to what the mechanical factors are which produce cross-infection and make the middle of the opposite lung the site of predilection. Consider for instance the left lung. The site of predilection is in continuous line with the direction of the left main bronchus, it is, therefore, reasonable to believe that material aspirated into this region follows the path of least resistance beyond the termination of the left main bronchus, as illustrated on figure 6. When lipiodol was injected through drainage tubes in right chest wall into an old empyema cavity while patient was lying on his left side, the lipiodol reached the main right bronchus through a bronchial fistula, gravitated around the bronchial bifurcation into the left main bronchus, and then out toward the periphery opposite the second to fourth ribs, the site of predilection. The corollary is, therefore, that this part of the left lung is the site of predilection, because the bronchi supplying it are the most direct continuation of the left main bronchus.

This secondary lesion is almost always peripherally situated and involves the parenchyma of the lungs. The infectious material must, therefore, be aspirated into the air vesicles proper. Prolonged maintenance of one posture, such as lying upon

the left side when right lung is primarily involved, apparently gives opportunity for the material to drain into the parenchyma of the lung, as was demonstrated artificially in case 4, figure 6. Consequently, patients with suppurative or destructive pulmonary lesions should always be instructed about the reason why they should not lie or sleep on the normal side.

Conclusions

Bronchogenic extension of pulmonary infection from one lung into the middle of the opposite lung is quite frequent, therefore, patients with destructive infectious lesions in one lung should be definitely instructed not to rest or sleep on the normal side.

The site of predilection of bronchogenic cross-infection usually develops in the middle of the opposite lung, that part of the lung which is seen between the second and fourth ribs on roentgen films. The site of predilection is apparently in the path of least resistance beyond the termination of the main bronchus.

Estimation of prognosis in any given case of pulmonary infection does not depend entirely upon the progress or retrogression of the original area of infection, but it is necessary to take into consideration whether or not there is a secondary

infection of other parts of the lungs

Knowing, therefore, that destructive types of pulmonary infections have a definite tendency to bronchogenic extension and that there is a site of predilection,

that part of the lung which is the site of predilection should be studied closely on the roentgen films in order to detect at an early stage the development of secondary infection

EARLY PULMONARY TUBERCULOSIS

(Continued from page 13)

will be able to make more early diagnoses and therefore be able to institute proper measures to effect an arrest of the disease at a time when the prognosis is best. When we reach this Utopian plane in the practice of medicine, we will be able to

make some appreciable change in the deaths of young adults caused by tuberculosis

NOTE This is first of a series of papers dealing with the management of early tuberculosis. The next, which will appear in an early issue of DISEASES OF THE CHEST, will concern Collapse Measures in Early Tuberculosis

IMMUNOLOGICAL RESPONSE TO DIFFERENT PROTEINS OF THE TUBERCLE BACILLUS

(Continued from page 18)

some agglutinins are formed, but never in a high concentration

The protein-carbohydrate combination is the active part of the tubercle bacillus and naturally more effective than the bacillus itself which consists partly of inert components as lipoids, soluble protein, etc., in the second place, the intact tubercle bacilli tend to clump and obstruct the pulmonary circulation thus making the use of repeated intravenous injections difficult, while the finely ground protein-polysaccharide complex has almost colloidal size and easily passes through the capillaries, its finely divided particles also expose a much larger surface to immunological attack by the body

It is interesting to observe that animals immunized by intravenous injections of the protein-polysaccharide complex do not become hypersensitive to tuberculin. To

produce hypersensitiveness subcutaneous or intraperitoneal injections are necessary

When tuberculin is used for diagnostic purposes the use of Old Tuberculin or of the water soluble tubercle protein is clearly unobjectionable. But when tuberculin is used as a therapeutic or immunizing agent, the protein-polysaccharide complex should be used. If the production of hypersensitiveness must be avoided, intravenous injection is indicated

Summary A complex molecule containing both tubercle protein and specific polysaccharide causes antibody formation after intravenous injection and hypersensitiveness after subcutaneous injection

Soluble tubercle protein and specific polysaccharide are partial antigens with hardly a trace of the immunizing power of the parent substance

DOCTOR! The Federation of American Sanatoria respectfully calls your attention to its special offer to you as outlined on page 32 of this issue. The Editor-in-Chief of DISEASES OF THE CHEST has been receiving numerous comments from physicians everywhere, and would appreciate your comments also

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ABSTRACTS



This department is devoted to abstracts of articles carefully and judiciously selected by the Editorial Staff

HOLMES, FRED G, and RANDOLPH, HOWELL Treatment of Lobar Pneumonia by Artificial Pneumothorax *Annals of Int Med* Vol 8 (OS, Vol XIII), Number 9 March 1935

The authors define lobar pneumonia as an infectious (usually pneumococcal) lobar atelectasis of the lung. Referring to the work of Coryllos and Bunbaum, they feel that such a conception of the disease is strengthened.

They described the pneumonic process as follows:

"The pneumococcal infection of the bronchus causes the formation of a very tenacious fibrin-containing sputum which may readily narrow or completely occlude a large bronchus. With the occlusion of the main bronchus to a lobe, lobar atelectasis takes place, beginning at the periphery where the greatest number of alveoli are found, and progressing toward the hilus, while there follows a pneumococcal cellulitis proceeding peripherally from the hilus abetted by the negative pressure in the atelectatic area. Physical findings early in pneumonia would seem to substantiate this theory, as we frequently find the breath sounds diminished early in the disease with no definite signs of consolidation. Several Roentgen-rays in our series demonstrate a condition which would seem to be best explained in this way." Holmes and Randolph discuss their series of 18 cases of acute lobar pneumonia treated by pneumothorax and draw the following conclusions:

- (1) Artificial pneumothorax causes a marked reduction of pleurisy pain in lobar pneumonia, and it improves the depth of respiration.
- (2) It lessens the toxemia.
- (3) It seems probable that the duration of pneumonia is shortened, and that

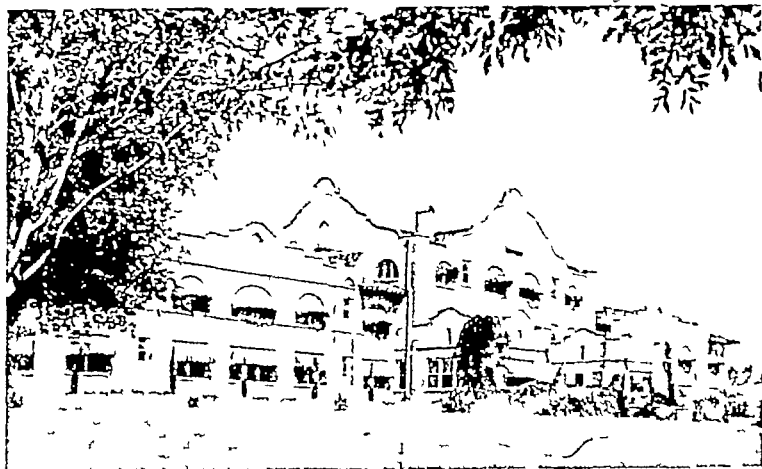
at times the crisis is brought about with dramatic suddenness.

- (4) In this series less difficulty was encountered from adhesions in adults than in children and there were fewer complications.
- (5) The danger of spontaneous collapse and empyema is increased in children.
- (6) Total mortality is decreased by use of pneumothorax and the chance of late complications such as abscess, bronchiectasis, or unresolved pneumonia, is probably reduced.
- (7) Spreading involvement to new lobes is checked.

MOSES, HENRY W. Malignancy in the Lung Including Eight Primary Carcinomas With Autopsy Findings *Annals of Int Med* Vol 5, No 6, p 765

A study of eighty-one patients with malignant tumors of various types in the lung present the following most common symptoms: Cough, with or without expectoration, which, if present, was usually bloody, to diagnose the condition earlier than is usually done, it is necessary that we concentrate our attention (1) upon those patients who complain of persistent cough without demonstrable causes, (2) upon those patients who expectorate bloody sputum at intervals with no tubercle bacillus in the sputum, (3) upon those patients who complain of general weakness, loss of weight, and do not react to the usual methods of treatment.

At present there is no successful treatment. Surgeons feel that surgery may be of benefit where it is possible to discover the conditions early. Electrical treatment, X-ray and radium may be the means by which this seemingly hopeless problem will be solved.



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HERSHBOECK, FRANK L. Spontaneous Pneumothorax. *Annals of Int Medicine*, Vol 4, No 7, p 705

By "spontaneous pneumothorax" Hershboeck means to indicate all pneumothoraces which are not induced by external factors, either accidental or for therapeutic purposes. It occurs most frequently between the ages of 15 to 45, males are affected more often than females, in the proportion of 4 to 1. It may be multilocular or unilocular, partial or total, simple or complicated with effusion, and may be recurrent. Of fifteen bilateral cases reported four have recovered.

Biach of Vienna reported 918 cases of which 715, or 77% were due to pulmonary tuberculosis, 65 to gangrene of the lung, 45 to rupturing of an empyema into the lungs, 32 to injury, various causes of lesser frequency, and 14 of unknown origin.

The author emphasizes particularly the so-called "idiopathic spontaneous pneumothorax" which, judging from reports in medical literature, occurs relatively frequently and in which no definite etiological agent can be uncovered from the history or the examination. These instances arise suddenly, as a rule, with or without dramatic symptoms in the way of pain or local chest discomfort, and with a varying degree of shortness of breath. They tend to run a favorable course, go on to spontaneous recovery in a few weeks with re-expansion of the affected lung and are rarely accompanied by pleural effusion.

The cause of idiopathic spontaneous pneumothorax from a necroptic standpoint is difficult to establish because of the rarity of necropsy findings, but it would appear that rupture of localized emphysematous blebs is the most frequent cause. These blebs may be the result of inducative processes in the subpleural pulmonary tissue, regardless of primary origin, or of emphysematous process in the proximity of adhesions. It is doubtful if pleural adhesions are, per se, a frequent cause. Tuberculosis is probably the most frequent cause of blebs in the apex of the lung. Hershboeck reports five cases of idiopathic origin and several cases with large emphysematous bullae.

MARIETTE, ERNEST S. The Dietetic Treatment of Tuberculosis. *Annals of Int Med* Vol 5, No 6, p 793

In a general discussion of diet as a treatment of tuberculosis the author points out that the over-feeding method of treating tuberculous patients is no longer accepted by the vast majority of specialists. Metabolic studies prove that increasing the diet beyond a certain point is detrimental to the cure of pulmonary tuberculosis because of the increased pulmonary activities necessitated by the increase in metabolism. A diet which is well-balanced and adequate for a man in health is sufficient as a basic diet for a person with tuberculosis unless there is definite gastrointestinal or nutritional disturbance present.

At the Glen Lake Sanatorium a diet of 3000 calories daily is in use. It contains 70 to 100 grams of protein and about 300 grams of carbohydrates. The balance is composed of fat. This includes one quart of milk daily, plenty of raw and cooked vegetables, fruit, meats, etc.

While tuberculosis is distinctly an infectious disease rather than a nutritional one, man is still searching for a diet which will improve the patient's chance for recovery. Thus Sauerbrück aimed to correct the excessive tissue hydration which occurs in tuberculosis by so planning the diet that the sodium chloride content of the urine is reduced to 0.2 to 0.3 grams per day. This is to be done through the substitution of mineralogen, a mixture of inorganic compounds containing 70% of calcium phosphate and lactate for table salt. This diet has apparently been beneficial in lupus but not so beneficial in bone and joint or pulmonary tuberculosis.

All vitamins are considered important in the diet of the healthy as well as the sick. Of particular importance is vitamin D because it has to do with calcium metabolism. However, it is not necessary to give commercially prepared vitamins because we can readily prepare diets from ordinary foods which will contain several times the minimum amount of vitamins required.



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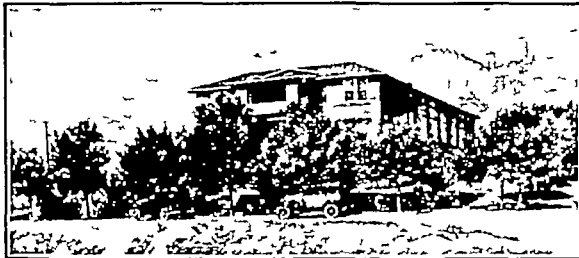
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QUERIES AND ANSWERS



Careful attention given to all queries
Names will be omitted if so desired
EDITORIAL
OFFICES 1018 Mills Building, El Paso

Q In the issue of May, 1935, of your magazine, DISEASES OF THE CHEST, the leading editorial on "Tuberculin Skin Tests in Children" is of considerable interest in that it advocates dosage of tuberculin which is ten times the usual maximum dose. The amount advocated is a dilution of 1 in 10 which would be 10 mgms. The usual maximum amount as used in the large surveys is 1 mgm.

A In the editorial above mentioned we meant to confine our discussion to known contacts. In advocating a dilution of 1 in 10, it was only advised in older children (who are known contacts) and only after a dilution of 1 in 100 had been negative. The 1 in 100 dilution should be used in older children first. In infants the usual 1 in 1000 dilution, of course, would be used. This dilution is about equally sensitive either by the Pirquet method or Mantoux, however, 1 in 100 Mantoux is definitely more sensitive.

Q I am especially interested to find out whether there has been any survey conducted which would tend to prove that a dosage of 10 mgms reveals a larger number of reactors than a dosage of 1 mg and whether this larger number is worth the extra amount of work involved.

A I don't believe that any survey has been made, that is, a mass survey, using a dosage of 10 mgms. And I don't think any one has ever advocated this dose in large surveys. However, men like Gregory, and Weill Halle of England have used the procedure described in the editorial on known contacts and have always used 1 in 10 dilution in the older children, when a dilution of 1 in 100 was negative. I think they felt that they were justified in the extra amount of work involved, in these older children, who were known contacts.

Q I should also be interested to know whether the author feels that the recommendation of the N T A that the maximum dosage of 1 mg is sufficient to pick up any reactor to tuberculin of any clinical importance should be revised, and if the author feels that surveys, such as conducted by Meyers, Heiberger, Aaronson, and many others, in which a mg maximum was used would be of more value if the larger dosages were employed.

A In the light of certain British observers, a maximum dosage of 1 mg is not sufficient to pick up all reactors in older children who are definite contacts. For the same reason I feel that the surveys above mentioned would be of more value if the larger dosage were repeated in the older children who were known contacts. It must be remembered that the introduction of tuberculin in any amount into the body of an individual who has never been infected cannot be followed by any ill effects, while the introduction of tuberculin within the skin of even a tuberculous patient is not attended by any serious mishap. The ill effects that have been reported is due to the subcutaneous introduction and not the intra dermal application.

Q Who established the first sanatorium for the treatment of tuberculosis?

A The first sanatorium was established by H. Brehmer at Goerbersdorf in Silesia in 1859. This institution is still in operation. Brehmer's patients were treated by

exercise on the theory that the cause of tuberculosis was a heart too small for the body. Exercise was to strengthen the heart, and help the patient overcome his disease.

SURGEON ERRANT

The Life and Writings of William Henry Bucher

Dr. Bucher Memorial Committee,
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DESCRIPTIVE OF NEW MEXICO

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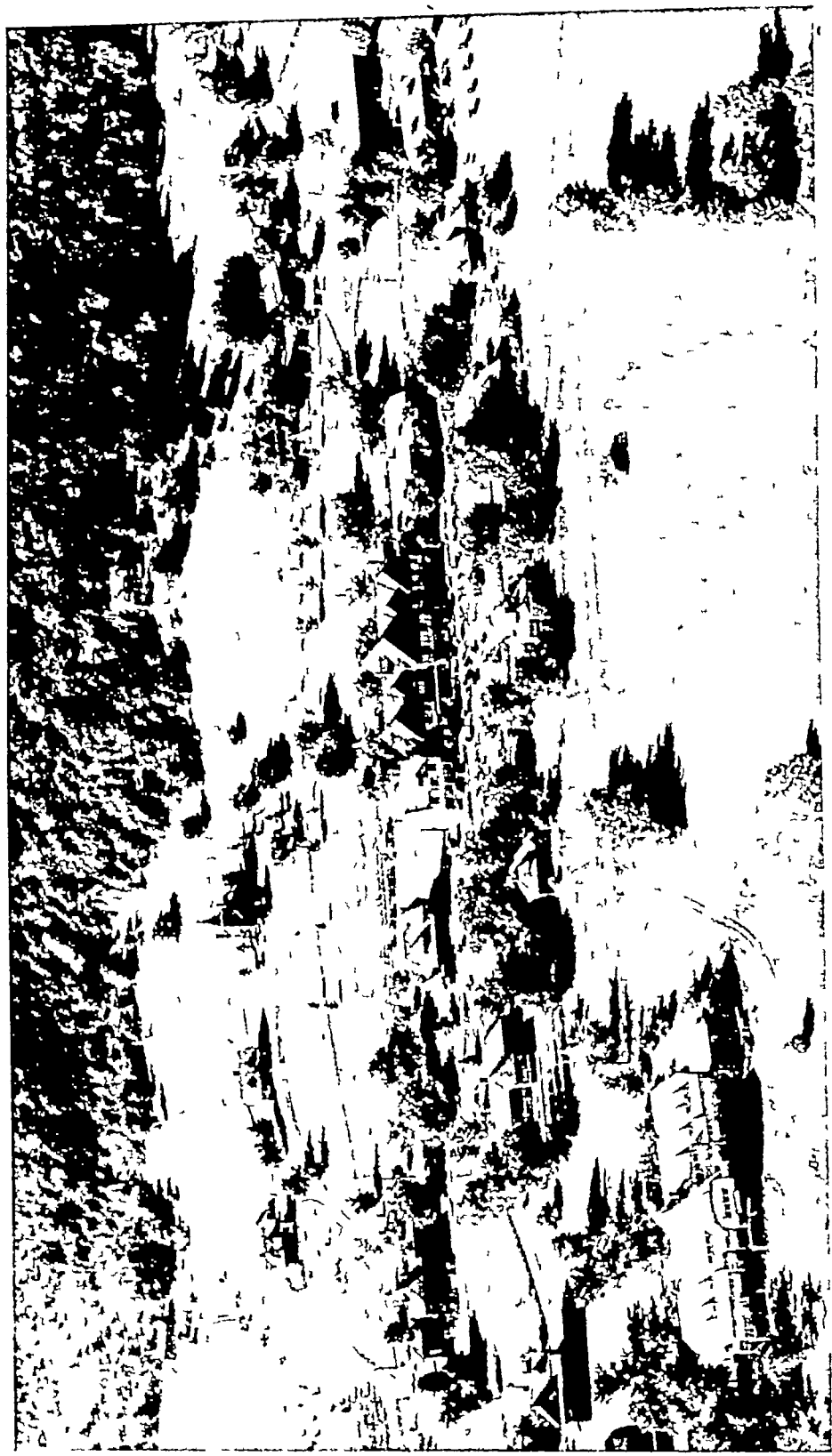
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HUMIDITY Monthly AM. (40-year average)	61	55.6	44.8	40.4	28.4	29.3	54.3	57.3	47	46.8	57	74.2
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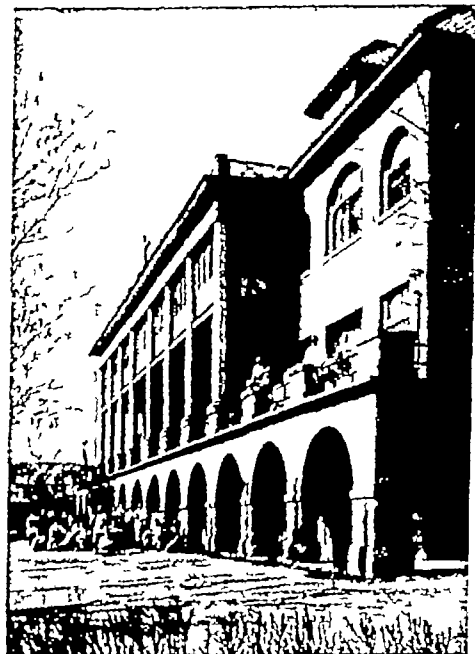
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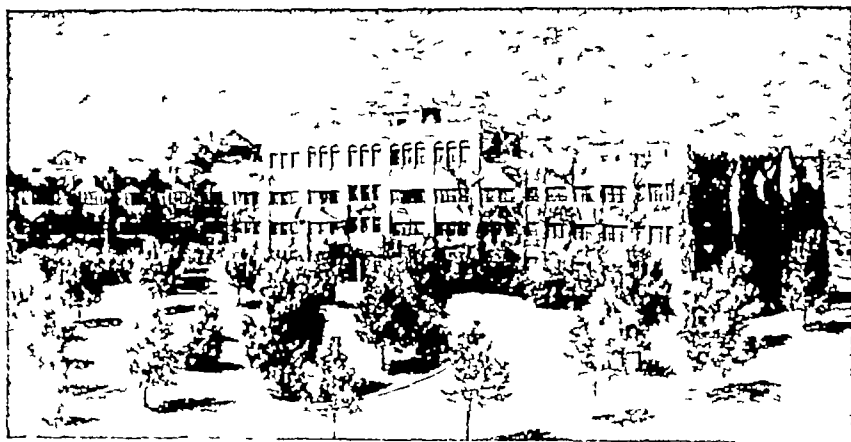
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Lawrason Brown, M D

Editorial Comment

THIS OUR GOOD FRIENDS of New Mexico
ISSUE will be hosts to the FEDERATION OF
 AMERICAN SANATORIA at Albuquerque, on August 10th, 1935 As a courtesy, DISEASES OF THE CHEST has devoted this number to New Mexico alone

To originate and publish a medical journal devoted wholly to diseases of the chest, has been no small task, however, from the general response from physicians throughout the country and from the very kind expressions by men who are really in a position to criticize we are encouraged to carry on This journal is intended to reach the physicians who have not been receiving a publication devoted to this subject, the intention being to provide concise readable articles on every phase of the various diseases of the chest that will be helpful to the busy general medical man These articles are being prepared by men of wide and rich experience in this field We feel that this is especially true, of this, the August number. The state of New Mexico has been blessed during the past quarter of a century with men who are nationally known authorities on chest diseases We are pleased to present, in this issue, several short, but excellent articles from some of these authorities It is our hope, from time to time, to have men in other sections develop a series of articles, and devote a whole issue to them, especially will this be true of each issue preceeding the annual meeting of the FEDERATION OF AMERICAN SANATORIA.

What are we waiting for? WITH PRACTICALLY sufficient beds already available in this country, we could segregate most of the open cases of pulmonary tuberculosis Many of these cases could be rendered closed cases in a few months, thus releasing their beds to the open cases When a typhoid carrier is found in a community, every precaution is taken in his case to render him harmless to his neighbors, but with tuberculosis still claiming more adult lives than any other disease, therefore creating an economic loss beyond calculation, it seems that we are being very negligent in the application of contagious disease control in this instance We hear and read much about the sharp decline in the death rate—it may be that, that is retarding our vigilance as to contagion We are also hearing a lot about collapse therapy, its wide spread application, even in the early cases Perhaps this over-enthusiasm in finding collapse therapy of such value, is blinding many toward the prevention program We hear men of authority in high places in medicine visualizing a tuberculous-free nation in a few years This is not an impossibility, however, only by the segregation and the control of the open case can we ever hope for such a happy state *Why is this not done?* why do our great medical organizations, especially those concerned with tuberculosis, not take a firm stand on the principal controlling factor, viz, the segregation of the open case? Surely that should be our main objective What are we waiting for?

The Trend of Collapse Therapy In Tuberculosis

THE INTRODUCTION of artificial pneumothorax forty years ago inaugurated the era of collapse therapy in

BY
WILLIAM H. THEARLE, M.D.
Albuquerque, N. M.

tuberculosis, which has subsequently been so markedly developed and broadened in its scope with the evolution of other surgical procedures that in recent years it has justly revolutionized the time-worn purely conservative regime of advanced phthisis.

The failure of modern sanatorium treatment to arrest the progression of pulmonary tuberculosis in a large majority of cases, when the stage of cavitation has occurred, has long been generally recognized as well as repeatedly emphasized by accumulated statistics, which conclusively prove that 85% of the patients with open tuberculosis die within a period of five years under conservative treatment alone.

This deplorable state of affairs was remedied by the development of collapse procedures, whose objective is to mechanically produce the requisite amount of functional rest or collapse the lung with closure of cavities. The professional inertia to collapse therapy, especially in this country, was not overcome until the World War, with its large number of chest wounds and thousands of empyema victims, focused attention on our surgical negligence of the thorax, and the experiences of this memorable period paved the way for the creation of thoracic surgery as an entity.

Subsequent years have only witnessed increasing achievements with progressive advancement in this field of surgery, with collapse procedures in tuberculosis occupying the leading role. The present trend in collapse therapy is almost universally toward the application of these measures in advanced cases when feasible, as well as its more general application in earlier cases, and also the heretofore neglected realization of collapse as a necessary public health measure in tuberculosis.

The present day attitude of progressive specialists toward this active treatment is strikingly brought to our attention by a survey of sanatorium statistics, which reveals that a decade ago collapse measures (chiefly pneumothorax) were used only occasionally by many and in 3 to 5% of cases by a number of others, whereas in the past several years the vast majority report the use of collapse treatment in from 50 to 75% of their cases. These figures obviously emphasize the well-proven fact that the days of watchful waiting and pure conservatism are relics of the dim past, and while it may seem a bit radical to some, yet I fully agree with Rist in his prophecy that the future treatment of frank tuberculosis is collapse therapy.

Briefly, the surgical measures of established value in this field are artificial pneumothorax and its auxiliary aid, intra-pleural pneumonolysis, phrenic exaeresis, and thoracoplasty. Deserving of at least passing mention are the procedures of scalenotomy, intercostal neurectomy, and extra-pleural pneumonolysis, which have a rather restricted field of usefulness but are unquestionably founded on rational surgical lines.

The universally recognized indications for collapse treatment are advanced tuberculosis of one lung, with but slight involvement of the other, also, chiefly unilateral disease with cavitation, and in similar cases for repeated or severe hemorrhages, provided the disease has not seriously invaded other vulnerable organs, or serious disease is not present elsewhere in the body. A diversity of competent opinion exists, though, as to the advisability of compression in early cases, as well as the procedure of first choice under a collapse regime. Suffice it to state in this brief resume, that modern sanatorium treatment remains the approved method.

of most phthisis therapists for handling early and minimal lesions, even though the addition of mechanical aids may probably expedite their recovery, while pneumothorax is obviously the procedure of choice of the vast majority because of its simplicity, safety and controllable compression.

Artificial pneumothorax is the best and most universal method for collapsing of the lung, but undue delay in its timely application has heretofore resulted in pleural adhesions that have prevented satisfactory collapse in over one-half of the indicated cases. The trend for its early and widespread use during the past five years has lessened the incidence as well as extent of restraining adhesions, and this fact has been strongly advanced by some authorities for the use of pneumothorax even in early lesions before pleural adhesions of any consequence have formed.

A wealth of pneumothorax experience has given us a clearer understanding of the dynamics as well as the many factors in collapse therapy. Such has also made us less fearful of the contra-lateral lung. The past several years have been noteworthy in pneumothorax with the development of selective collapse, which is based on the fact of decreased expansibility of diseased lung tissue due to fibrosis, retention, and atelectasis, while adjacent normal lung undergoes a corresponding compensatory emphysema with increased respiratory activity. This latter advancement has been further extended during the last couple of years by its use in cases of bilateral disease with cavitation, and while the limits of bilateral selective collapse are manifestly more exacting in indications as well as scope, yet it is a measure of unquestionable value in some otherwise hopelessly far advanced cases.

Intra-pleural pneumonolysis The severance of pleural adhesions by the operation of intra-pleural pneumonolysis is an indispensable adjunct in pneumothorax therapy, which is almost universally performed as a closed procedure by the electro-surgical method. The necessity of this surgical

aid is best illustrated by Matson's excellent statistics, which report the attainment of successful pneumothoracies in 60% of patients after division of adhesions.

Phrenic exaeresis The indiscriminate use of phrenic operations in tuberculosis is to be deprecated. This minor surgical procedure has its greatest value as a supplementary aid to pneumothorax, most often on completion of this therapy, and at times during its course when inoperable adhesions prevent the ideal state of complete compression. It will also be found valuable in some early cases who need a little more than purely bed rest to make the grade, and in such cases a temporary paralysis of the diaphragm by simply crushing the phrenic nerve is the procedure of preference rather than the radical or permanent one of exaeresis. The routine employment of phrenicectomy before thoracoplasty is in my opinion a mistake, as satisfactory collapse of the entire lung by modern complete thoracoplasty will seldom require the aid of a phrenic. This view is not held, though, in cases of apical or partial thoracoplasties, when quite often phrenic exaeresis can be advantageously combined to lessen the risk of later lower lobe activation. It is also unquestionably of value in cases of hemorrhage when adhesions preclude adequate pneumothorax compression.

Extra-pleural thoracoplasty Extra-pleural thoracoplasty is, next to pneumothorax, the most valuable and definite procedure in collapse therapy. Its radical aspect, however, demands a much better physical condition, as well as a more rigid selection of cases, than any other type of compression therapy. The earlier and more general application of pneumothorax has lessened in recent years the need for this radical surgery, and the present trend in this direction is aptly expressed by Hruby, with the statement, "The thoracoplasty of today represents our ignorance of yesterday."

As an aftermath of the limited or selective collapse of pneumothorax, there is a growing tendency for the similar utilization

(Continued to page 22)

Hilum Tuberculosis in Adults

TUBERCULOUS DISEASE of the tracheo-bronchial lymph nodes is quite common in childhood, but is considered

BY
CARL MULKY, M.D., F.A.C.P.
Albuquerque, N. M.

rather rare in adults. Active hilum tuberculosis in adults probably occurs more often than is generally recognized, as it is a difficult condition to diagnose. Distinction should be made between a tuberculous infection which is apparently well healed and produces no symptoms and an inflammatory process which causes toxemia and other constitutional disturbances. The physical signs and x-ray findings of active hilum tuberculosis do not differ much from those of a healed infection, and the final diagnosis rests mainly on symptoms.

Hilum tuberculosis, when active in adults, is a slow, smouldering, infectious process of extreme chronicity which results in semi-invalidism without obvious cause. It occurs most often in individuals of the allergic type who possess an unstable neurocellular equilibrium and are generally regarded as being neurotic or having an endocrine imbalance. It is probable that these persons are allergic to tuberculous toxins and react strongly to mild infections that would not affect an ordinary individual.

The symptoms of hilum tuberculosis in adults vary considerably but certain features occur quite constantly. The onset is usually insidious and the duration indefinite. The patient tells of gradually developing ill health, with frequent "colds," loss of energy, and fatigue. A low grade of fever of 99 to 100 afternoon maximum is usually present. This daily elevation of temperature often lasts for months or years without much change, although long periods of remission may occur. A rapid pulse rate is usually found. It is readily increased by exercise or excitement, and is nearly always higher than the slight fever would warrant. Dyspnoea on slight exertion is a frequent complaint. Cough may or may not be present. It usually occurs as a dry, hacking cough with little or

no sputum except when an intercurrent bronchitis is present. Pains in the chest of various types are usually

noted. Occasionally a definite pleurisy with dry friction rubs can be made out. Hemoptysis is a relatively common symptom. It is seldom excessive, usually being not more than blood-streaked sputum. Loss of weight is not a distinguishing feature, as many of these patients are well nourished throughout their long illness, although anorexia and digestive disturbances are of frequent occurrence.

Nervous symptoms are present in most of these cases, and frequently they are the outstanding feature. These patients are usually emotional and prone to be hysterical or hypochondriacal. There seems to be a general nervous instability suggestive of hyperthyroidism, yet the basal metabolic rate is within normal limits.

There are no definite physical signs indicative of active hilum tuberculosis in adults, as any of the signs of hilum disease that have been described by various observers may be found in individuals who are obviously perfectly well. On the other hand, persons with all the classical symptoms of hilum tuberculosis frequently present no abnormal physical findings in the thorax. It can readily be understood that a few small caseous lymph glands, situated deeply in the mediastinum, could hardly produce any changes per se that would be detected on the surface. Such abnormal physical signs that occur must be attributed to fibrosis and congestion of the surrounding tissues. The physical signs relative to tracheo-bronchial adeno-pathy have mostly been observed in the study of hilum tuberculosis in childhood, but they are equally applicable to the disease in adults. The one perhaps most frequently mentioned is D'Espine's sign—the conduction of the whispered voice sound with its characteristic tracheal timber down the spine below the level of the tra-

cheal bifurcation With this sign present, there is usually increased dullness over the thoracic spine, with a more or less oval area of para-vertebral or inter-scapular dullness

Para-sternal dullness is also found at times when the involvement is in the upper tracheal group of lymph nodes Eustace Smith described a venous hum heard at the root of the neck when the head is bent sharply backwards, which was explained as due to compression of the left innominate vein as it passed behind the sternum by enlarged glands or inflammatory thickening I have found it occasionally in adults presenting other signs of tracheo-bronchial gland enlargement Rales are not often present with hilum tuberculosis, although fine mucous rales occurring in patches over the roots of the lung on one or both sides of the spine may now and then be present They are most frequently noticed when the patient speaks of having a "cold," but are quite different from the sibilant or wheezy rales of bronchitis

Examination of the sputum for tubercle bacilli is usually disappointing, as most of the patients have no sputum except when they have a cold and then it is distinctively bronchial in origin and seldom contains tubercle bacilli However, in about one-third of the cases that I have seen, tubercle bacilli have eventually appeared in the sputum without any evidence of extension of the disease into the lung parenchyma

The roentgenological findings in hilum tuberculosis of adults are usually indefinite and inconclusive Like the physical signs, the x-ray gives no clue as to the activity of the infection The hilum shadows are apt to be denser and wider

Causes of Massive Collapse Neither the aetiology nor mechanism of massive collapse has yet been explained satisfactorily Recent theories consider that posture may be a causative factor or that a combination of factors, such as the inhibition of the cough reflex, with impairment of respiratory function and resulting accumulation of secretions, and blocking of the bronchi lead to atelectasis Usually the

condition develops during the first few days following operations The patient complains of sharp pain in the chest, and cough The temperature is elevated and respirations are increased and embarrassed The condition may simulate pneumonia closely and may be diagnosed as such Roentgenological examination will show dense pneumonic consolidation and elevation of the diaphragm.

than is usually considered normal, the bronchial markings in the central lung fields are heavy and may appear beaded, and numerous calcified or partially calcified glands may be seen These findings only show that a tuberculous infection has at one time occurred but do not tell whether it is at present causing symptoms or not The same is true of the tuberculin test, which, if positive, means that infection has taken place but provides no measure of its intensity or activity

The final diagnosis of active hilum tuberculosis is made largely by elimination The fact of an active or healed tuberculous infection is established by the tuberculin reaction and x-ray If no other tuberculous process in the lungs or elsewhere is found, and other diseases which might cause similar symptoms can be eliminated, it is safe to assume that the illness is due to tracheo-bronchial tuberculosis

With proper care, the prognosis in cases of adult hilum tuberculosis is favorable The tendency is to eventual recovery, although a complete return to normal health often requires several years Extension of the tuberculous process into the lung parenchyma, with rapid progression and fatal results, occasionally occurs Secondary invasion of other organs, such as kidneys, bones or joints, sometimes results, but have not been frequent in patients under my observation

The treatment of hilum tuberculosis consists of routine rest and general hygienic measures such as would be used in any form of tuberculosis Attention to the patient's environment to ameliorate the nervous and mental symptoms is required, as a proper mental attitude on the part of the patient is most important

Requirements for the Care of the Tuberculous Patient

IN SOME WAYS the management of a sanatorium is very similar to the management of a general hos-

pital. Grounds have to be bought, buildings planned and constructed, equipment and furnishings have to be installed, capable nurses arranged for, suitable employees hired, supplies estimated for and purchased.

But in many ways the needs of the sanatorium are quite different from the needs of the hospital. Even in some of the items I have mentioned, there are differences. Therefore this paper will be, in the main, a study of the problems of the sanatorium as compared to those of a hospital.

First, the location of the sanatorium is extremely important. The ideal location is in a climate that is most favorable to the comfort of the tuberculous patients. I wish to emphasize *sanatorium*, because sanatorium is the principal factor in the modern treatment of tuberculosis. It is a costly mistake for a patient to change climate expecting to be cured of his disease by climate alone. If a patient has not the means to live in a sanatorium in a favorable climate, he should enter a sanatorium in his own locality.

If it is impossible to locate the sanatorium in the favorable climate it should at least be situated in the country away from the smoke and dust of the city.

Since fresh air is one of the requisites in the treatment of tuberculosis, the sanatorium must be built so that each patient has a sleeping porch where he can have an optimum of fresh air. This sleeping porch should face the south or the east, protecting him from severe north or west winds and providing him with quarters bathed with the life-giving rays of the sun. Opening off the sleeping room should be another room which the patient may use for dressing, eating his meals in chilly wea-

BY

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ther, or to lounge in during his up time. In addition, most sanatoriums provide recreation rooms where patients may congregate, hold social gatherings and enjoy other diversions.

Heliotherapy, or sun treatment, properly administered is an important adjunct in the treatment of tuberculosis. Specially constructed sun treatment rooms (solariums) have to be arranged for in making plans for a sanatorium. These rooms have to be built to permit the direct rays of the sun to shine on the patient's body during the exposure, to provide protection from the wind and from curious eyes. If glass is used as a protection against the cold (which is necessary in the more severe climates) a specially made glass has to be used. Ordinary window glass excludes the violet rays which are the healthful and beneficial rays of the sun.

Next as to equipment. Here, too, special arrangements have to be made to treat the patient with tuberculosis properly. The majority of sanatoriums have a nose and throat room equipped with instruments and apparatus for examining and treating the ear, eye, nose and throat. Some sanatoriums have a room equipped for the visiting or resident dentist. A room in which ultra-violet ray treatments are given is found in practically all sanatoriums. The X-Ray and Laboratory departments will not differ greatly from such departments in general hospitals. Perhaps the equipment in these departments need not be so elaborate or complete in the sanatorium. However, if any research work or special study of the disease is made, a complete laboratory and an up-to-date X-Ray equipment are necessary.

Pneumothorax, as a treatment in certain suitable cases, has been accepted as a standard treatment by all tuberculosis specialists, and its widespread use is one

of the greatest strides the medical profession has made in treating tuberculosis in recent years. Every sanatorium, recognized as such, has a room equipped to give pneumothorax treatments. Many of our leading tuberculosis doctors are advocating that phrenicectomy, thoracoplasty and other lung surgery be done at the sanatorium instead of sending such cases to the general hospital. This requires an operating room equipped for major surgery.

From casual observation, one might suppose that the personnel of a sanatorium would not differ greatly from the personnel of a general hospital. But experience has taught me that specially trained and specially qualified staff members, nurses, and employees are prime requisites of a successful sanatorium. I believe that the personnel of a sanatorium cannot be too carefully selected. This importance grows out of a certain factor in sanatorium life which is entirely different from that of a general hospital, namely, the duration of time which tuberculous patients must remain under our care. A patient in a general hospital might easily endure a tactless nurse or a careless orderly for a few days or weeks, but it can easily be seen that such a circumstance would become exasperating beyond endurance to a tuberculous patient who must remain for months or even years. To be really successful, a sanatorium must have a personnel that can bear the test of long acquaintance, from the superintendent down to the tray boy.

If the superintendent of a sanatorium has ever held a responsible position in a general hospital, he will probably tell you that there is a vast difference in managing the two. Situations that may be handled with firmness and dispatch in a general hospital are often more successfully met with tact and diplomacy in a sanatorium. The qualities of fairness, fortitude and good temper are indispensable to the superintendent of a sanatorium. Because sooner or later practically all the problems of the sanatorium come to the superintendent, I believe that the substance of

this paper will cover most of his problems.

The medical staff varies with the size and location of institutions. Many sanatoriums have a resident medical director whose home is on the grounds and whose entire services are devoted to the sanatorium. Others have visiting directors who live near and devote only part time to the sanatorium. In either case the attending physician must be properly trained in the diagnosis and treatment of tuberculosis, and in addition should possess the insight to understand the psychology of the tuberculous patient. It goes without saying that he should also possess a pleasing personality.

The number of assistants the medical director has will depend upon the patient population. The American Sanatorium Association has estimated that there should be one physician to every 50 beds to give the patients proper treatment and supervision. I believe that every sanatorium should make provision for one or two internships. One of the chief aims of the campaign against tuberculosis is an early diagnosis, and there is no place where the young doctor can receive training in the diagnosis of this disease such as he can get in the sanatorium.

Next in order is the nursing staff. It is well that the nurse has a background of general nursing, but it is not absolutely necessary. Many graduate nurses find tuberculosis nursing considerably different from general nursing, requiring special training and experience. Besides being a nurse she has to be a teacher, and it requires tact to tell a patient that he must not be careless in the disposal of his sputum or to warn him that he is not covering his mouth and nose with gauze or paper napkin when coughing or sneezing. Some patients are very sensitive and are quite easily offended when they are told that this is necessary. And it is necessary because it is part of the education of the patient, not only for the safety of the other patient and attendants in the sanatorium, but also for the safety of other

members of that patient's family and the general public when he leaves the sanatorium. Through the ex-sanatorium patient part of the education against tuberculosis is carried on. The nurse has to be just as tactful in telling or warning the patient that he is not taking sufficient rest or is not "chasing the cure" properly. The main burden of educating the patient falls on the shoulders of the nurse. She should have the full co-operation of the medical director in seeing that the patient understands and is learning to take the proper care of himself.

The employees in a sanatorium will not vary a great deal from those in a general hospital—but there are a few differences. The sanatorium naturally requires orderlies, maids, domestics, carpenters, plumbers, engineers, etc. just as does a hospital. It goes without saying that these must be clean, orderly, accommodating and industrious in both sanatorium and hospital. In addition many sanatoriums have a dairy farm and poultry yards to assure the institution an abundance of fresh eggs, milk and other dairy products. As a rule, a general farm is run in connection with the dairy farm so that this produce can be procured economically. If the sanatorium is isolated, it may be necessary to furnish a water supply and produce electricity at the institution. It will be seen that the superintendent must be quite versatile to oversee all these departments.

I have left the tuberculous patient to the last for discussion. After all, the sanatorium is built and maintained for his benefit. The patient himself is not different from any other sick human being, but the disease and treatment are different. We have to deal with a chronic infection where the patient has to spend a good portion of his day in bed for many months and sometimes many years,—a disease that is characterized by many "flare-ups," set-backs, and other discouragements. The majority of the patients are young adults, who are full of life and vigor, and to whom it is a real hardship to lie quiet in bed instead of

being up and doing. As a rule, the illness is not severe enough in itself to enforce quietness and idleness. So it is no wonder that there is a certain amount of restlessness, discontentment and discouragement. Generally it is quite easy to encourage the tuberculous patient, "Spes phthisica" or the hope of the consumptive is an old observation. On the other hand the tuberculous patient is notoriously restless and inclined to wanderlust. He is always chasing a will-o'-the-wisp, as one of my patients recently so aptly remarked, "Get T B and see the world." It is up to the sanatorium authorities to see that the patients are properly amused and contented. Occupational therapy, talkies, entertainments, radio installation, games, etc., have to be carefully selected so that they will not interfere with the treatment of the disease.

Probably the greatest source of worry and grief and gray hairs for those in charge of a sanatorium is the problem of diet. Always a difficult one, even in a general hospital, this problem is complicated in the sanatorium by the anorexia which is a prominent symptom of tuberculosis and by the fact that the patients usually remain long enough to tire of the menu and the cook. The third complication is the chronic grumbler, who can cause dissatisfaction among a large group of patients.

It is not easy to suggest solutions to this ever-present problem. The best the superintendent can do is to furnish the best diet his resources permit, to solicit that all complaints come to him or some of his lieutenants directly. If the diet cannot be arranged to suit the patient tell him so frankly. As a means of protection to the sanatorium and to the other patients, discharge the chronic and persistent open grumbler.

We can see then that the requirements for the case of the tuberculous are many and varied. The properly equipped and managed sanatorium still is and probably always will be our best means of fighting tuberculosis.

X-Ray in Tuberculosis

THE IMPORTANCE of X-Ray in Tuberculosis has assumed such a large role that only a few points can be touched in a short article

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Only a few years ago the physician used his patient's history, his stethoscope, his fingers and the microscope to prove or disprove the presence or absence of Tuberculosis in an individual, and, strange to say, we were fairly well satisfied with ourselves. Today we have an added and valuable agent in the X-Ray

In the early use of X-Ray, only the more dense parts of the body could be differentiated. The reasons for this condition were imperfections of the apparatus, which were largely due to fluctuating tube vacuums, unstable currents, and irregular transformation of current.

These difficulties have been overcome, to a large degree, with the result that soft tissue differentiation is now possible, the degree being dependent upon the type of apparatus and the skill of the operator.

When this stage was reached, pulmonary pathology could be depicted upon sensitized plates, and from this time on the progress has been rapid in chest work.

The next step in importance, so far as diseases of the chest are concerned, was the stereoscope. This relatively simple instrument not only gives us the dimension of depth to the thorax, but throws out overlaying confusing shadows in such a way that much of the uncertainty in shadow differentiation is eliminated.

The visualization of actual pathology in parenchymal pulmonary tissue is frequently of less importance than the visualization and study of the surroundings in which this pathology lies. The push or pull of mediastinal structures, the elevation or depression of the diaphragmatic area, the condition of the costo-phrenic and cardio-hepatic angles, and a careful survey of the bony area often give us a lead to the etiology back of our visualized pathology.

For tissue differentiation, in diseases of the chest, the importance of a standard technic cannot be stressed too much, as many

of those patients are restless and go from place to place carrying with them films made at various places. Some of these films have been made at 36" distance, others at 48", and others at 72" and 84", to say nothing of the degree of penetration and exposure time, which are just as essential in good chest work. The National Tuberculosis Association has undertaken to standardize this work, and it is now rather generally understood that six to seven feet distance with a short exposure time gives the best results, although, we still have films sent in or brought in that were poorly made from every point of view. From such films we are asked to make a comparative study of the progress the case has made.

The technic advised by the National Tuberculosis Association is seven foot target film distance, 1000 milliamperes and 1/30 second exposure time. For many installations this, of course, is impossible, but most present day machines are capable of 100 milliamperes, and good, clear chest films can be made using 7 feet and 100 milliamperes in 1/10 second, by using a little higher KVP. The hilum blur with this technic is slight and compares favorably with the 1000 milliamperage technique.

The time is not far distant when this objection, multiplicity of technics, will be eliminated and a standard short exposure, high milliamperage technic will be used universally.

The fluoroscope offers valuable aid, in that an unlimited number of views of the part can be studied. It is particularly valuable in moving parts, such as diaphragmatic excursion, heart movements, etc., and is now used routinely in determining refills in artificial pneumothorax. I feel that entirely too much dependence

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Rest in the Treatment of Pulmonary Tuberculosis

THE UNDERLYING FACTORS

on which all treatment of Pulmonary Tuberculosis is based are, rest, food and fresh air, and of these factors, rest is by far the most important. While all of these factors have been modified or emphasized during the past fifty years since E. L. Trudeau first specialized in the sanatorium treatment of tuberculosis at Saranac, rest is the one factor which has stood the test of time.

While a full diet is still advocated, forced feeding has fallen from favor. During the past few years stress has been placed, especially in Germany, by Geison, Sauerbrauch and Hermannsdorfer, on the favorable influence of a diet with marked restrictions of sodium chloride.

However, it is in the matter of rest that the greatest and most successful advances have been made.

Physiologically, the least expenditure of energy is made during rest and the greatest opportunity is given to the organism for repair. Especially during fever is the value of rest shown. Fever is usually an indication of the amount of toxemia present. With increase of temperature there is a corresponding increase in pulse rate and respiration, larger amounts of toxin are massaged out of the tuberculous areas of the lungs, and into the circulation, to be distributed generally. In a study some years ago I found a definite relationship between the height of the temperature curve and the amount of bed-rest to bring it to normal. The respiration rate of a patient actively engaged is about twenty to twenty-two per minute. Bed-rest brings this down to fourteen or fifteen a minute. The pulse rate drops about twenty beats at bed-rest. The saving in the amount of toxin that the organism must destroy is obvious.

Although the very gratifying results due to improvement in technique in medical

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and surgical procedures for obtaining greater mechanical rest for the diseased lung have brought about an

advocacy for the early use of such procedures, most observers still feel that the patient's chances for recovery are best served by a period of bed-rest of from one to three months at the onset of treatment. If strict bed-rest is enforced at this time further surgical methods will be unnecessary in a large number of cases.

Brehmer in Germany first advocated sanatorium treatment and stressed the value of fresh air, good food, and exercise. His patient and pupil, Dettweiler, found the exercise too strenuous and substituted modified exercise and long periods of rest, after determining from personal experience that he made better progress when he spent a good portion of the day at rest in a semi-recumbent position. His rest-chair is a fore-runner of the modern recliner which is now standard equipment at most sanatoria.

When Trudeau opened his sanatorium he put into practice Brehmer's ideas and advocated some exercise for his patients. There is a story that his attention was focused on the value of rest after one of his patients broke a leg and was forced to remain in bed, and during this period of enforced rest showed a marked improvement in his symptoms and signs.

Postural rest has long been advocated by Gerald Webb and his associates at Colorado Springs. The patient lies on the affected side for increasing periods daily. It has been shown that in this manner less strain is put on the diseased lung and usually there is a corresponding increase in favorable symptoms.

Various splints have been devised to rest the impaired lung, such as adhesive strips, metallic clamps, pneumatic jackets and shot bags. Because of the rigidity of

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Climate in Asthma

IN THESE DAYS no thoughtful physician seriously doubts the atopic, or allergic, basis for the vast majority, if not all, cases of bronchial asthma, even including that group variously called "non-sensitive asthma," or "asthmatic bronchitis." This being so, such a physician will, given the opportunity, insist on the proper, and as thorough as possible, testing of his asthmatic patient, by the best means at his command for specific sensitivity, and if such sensitivity is found, provide either for desensitization, or avoidance of the offending substance. Should foods, pollen, dusts, or other such substances avoid conviction as "guilty," (bearing in mind that it is entirely possible that bacterial protein from teeth, tonsils, adenoids, sinuses, etc may be the specific cause), he will look for and eliminate, as far as he can, such offenders, if their presence is clear. But, if he has seen much of asthma, he will not urge, nor permit, too much mutilative upper respiratory surgery, nor will he delay too long in calling upon every form of therapy for such cases, if freedom from symptoms or an approximation of such a condition is not promptly achieved. And, granted all this, he will still be disappointed with his results in a sufficient number of his asthmatics to keep him duly and appropriately humble, if he is honest with himself.

To me, the atopic theory of the causation of asthma is proved, but that proof is only a bridge over part of our ignorance of the causation of asthma. To say that there is an "hereditary predisposition" or "sensitivity" is, it seems to me, to change words, and not to clear up our ignorance of why one individual suffers from atopic or allergic symptoms, and another does not. There *must* be some other factor than the specific substance, protein, or attached to protein, and we don't know what it is. We do know that if we can find the specific substance and remove it

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from the patient's environment, or him from it, or desensitize him to it, he is relieved, and that perhaps permanently. And we also know that while this is possible in approximately four-fifths of the cases where the onset of asthma occurs in infancy and one-fourth of those where the onset occurs during adult life, yet, with increasing age of onset, sensitivity which can be proved, diminishes. For those cases where all this is possible, such treatment is usually adequate, though not by any means always. Where it is not, it seems to me that change to a dry, usually mild, and often high, climate, is frequently of paramount importance.

I am aware of the fact that this method of treatment is old-fashioned, that it is empiric and non-specific, and that it is, therefore, often, it seems to me, erroneously called "unscientific." Simply as advice to "change climate," I agree it is. But I am certain that there are very few among the physicians practising in such climates that have not seen some very brilliant apparent cures in asthmatics occur in such climates where almost every specific and "scientific" therapy had been previously tried, without benefit of climate, and failed to bring about improvement. I think we should all agree that these brilliant results occurred, perhaps, chiefly in the younger group—who everywhere do better, that they also occur most commonly where there are complications such as sinusitis, ethmoid infections, and the like—but what case of asthma does not have such complications, early or late? And which case is it where the complications exert a beneficial effect on the asthma, or vice versa? We should also, I think, agree that it is not the asthmatic that seeks a favorable climate and then indulges in all, or most, of the hygienically unfavorable practices of life at will, who does well, nor last, but not at all least, does it seem to be the patient that

completely avoids skilled advice, that benefits from climatic change

I am not arguing for a return to the unscientific and careless treatment of asthma, by propitiation of unfavorable local gods, or seeking new ones. I do not believe that ignoring the careful, scientific and proved laboratory work of the allergist will aid the asthmatic patient. And I have no belief in magic properties of climate. But I do believe it to be quite scientific and intelligent to make use of climatic advantages in the prevention and treatment of complications of such a continuing disease as bronchial asthma, in conjunction with means put at our disposal by discoveries made in the laboratories since the beginning of the century. To secure benefit from climatic advantage, careful study and careful supervision, both in the patient's home environment and in his new environment, must be carried out and persisted in. When this is done, I am fully convinced that climatic advantage is almost always very valuable and sometimes absolutely essential to the removal or marked alleviation of symptoms. In numerous cases which have come under my observation, both in certain schools where I have the privilege of acting as attending physician, and in private homes, and where every method very ample financial resources could command had previously been tried before climatic advantages were sought, this conviction has been sustained. The more carefully the hygiene of the patient's life has been regulated, and the more carefully the directions of the trained allergist on whose recommendation the patient has frequently come to us, are carried out, the prompter and more complete the results. Early, the results of indiscretions and rebellions are relapses. But after continued alleviation or absence of symptoms, more and more freedom may be allowed, with no relapses. And in the end, I have seen children helpless invalids from four to twelve years with marked and well-proved sensitivities, not yielding to treatment in less favorable climates, become robust athletes, able to withstand without any

symptoms all the foods, pollens and dusts that previously would throw them into paroxysms of asthma during their stay here. And I have seen these same individuals later return to their homes where the trouble started, settle down, marry and raise children, with no return of symptoms. The removal or alleviation of symptoms seem permanent, without the more precise and "scientific" desensitization methods ever having been used or tried, after the change of climate.

We all must admit, however, that such cures may occur apparently spontaneously anywhere, though this is certainly rather rare except as a gradual diminution of attacks and their final disappearance over long periods of years. There is, however, one aspect of the question which seems to me very important. The reaction to the specific substance to which the patient is sensitized may be either in the muscles of the bronchial walls resulting in spasm, or in the vessel walls, with oedema. Yet bronchial changes and changes in the mucous membranes of the upper respiratory passages leading to sinusitis, ethmoiditis, and chronic rhinitis in the upper reaches, and chronic bronchitis and perhaps bronchiectasis in the lower, we always have in bronchial asthma, more pronounced the longer the asthma lasts. These complications, if allowed to persist, become permanent, or practically so. They can be, admittedly, usually prevented, usually relieved, and often cured, by residence in a favorable climate. And, as I see it, they are so prevented, relieved or cured in the asthmatic as well as the non-asthmatic patient. Freedom from or relief from these complications, I believe, is much more reasonably to be expected when the advantages of climate are sought reasonably early in the course of the true "sensitive" bronchial asthma. And prevention of such later effects, or rendering them impermanent rather than permanent, I consider well worth while in all cases, and at times almost as important as the alleviation of the asthma itself.

I do not know the exact mechanisms by
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Bilateral Collapse Therapy

TO A MERE HANDFUL of men in private practice and to the staffs of a few institutions in this country is due almost all of the credit for fighting the battle for collapse therapy. Only after thirty years did a few men break down the resistance of the medical profession at large and the public in general to an acceptance of the present intensive widespread use of collapse measures. The pioneering was necessary and valuable, but the most important work has been done since 1930.

There are two schools still remaining—the radical and the conservative. One who is conservative institutes the collapse therapy needed as soon as a diagnosis of tuberculous cavity is made, and one who is radical allows delay.

Even some men of wide experience in collapse therapy have done only a very limited amount of bilateral collapse, and though good work in this field was reported in 1912, practically all of the thousands of cases required before antagonism can be broken down have been treated during the past five years.

My experience is confined to more than three hundred cases of bilateral collapse. The majority of the series were pneumothorax on one side and one or more phrenic nerve crushings or a phrenicectomy on the contralateral lung, this being the better lung. If pneumothorax could not be given for the lung more seriously involved, a phrenicectomy was usually done followed by a thoracoplasty if required, provided a selective collapse could be obtained for the better lung. Of this series approximately seventy-five patients were given bilateral pneumothorax, eight had bilateral phrenic nerve surgery, seven had pneumothorax opposite a partial or complete thoracoplasty, and fourteen had a paraffin fill usually on the better side.

One may reasonably expect at least ninety-five per cent of these patients to

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die within five years if no collapse therapy is given. Most of the work was started in 1931, 1932, and 1933 and naturally is not all completed, but one is justified in expecting a salvage of half of these patients.

Recent letters from three patients who had pneumothorax opposite a rather complete thoracoplasty report no cavity, no fever, and no sputum for more than one year. Recent reports from nine patients who had bilateral pneumothorax begun in 1930 and 1931 indicate that these patients have had their cavities closed for more than two years.

The patients in this series who had only phrenic nerve surgery for collapse treatment of the better lung were the more favorable group, and in all but approximately twenty-five per cent this amount of bilateral collapse was sufficient. However, not infrequently more than one nerve crushing was used, or an alternate nerve crushing was done to relax adhesions on the side of pneumothorax.

Bilateral collapse therapy is salvage work on otherwise practically hopeless patients, and many who die do so because they have tuberculous complications at the beginning of treatment or they develop complications early regardless of the type of treatment given. However, tuberculous complications rarely should be allowed to cause a patient to be denied collapse therapy because frequently a patient may be greatly benefited by active treatment in spite of complications.

In 1932 we exhibited at the American Roentgen Ray Society the serial X-Ray plates of ten patients who had had their bilateral cavities closed by a bilateral collapse for more than nine months, during which time they had had a negative sputum and an excellent clinical course. All of these patients except one are apparently well now. This patient did well for

few months and then died of a massive pulmonary hemorrhage. He had had two phrenic crushings opposite a complete thoracoplasty, but the diaphragm continued to move and a 450-gram paraffin fill was used which apparently closed the apical cavity. Autopsy could not be obtained.

In treating bilateral pulmonary disease, fear of long standing, still maintained by some, is that which concerns a so-called "burden" on the better lung. If there is such a thing as a "burden" on the better lung, then it must be very rare indeed. Certainly the "burden" is present before, not after, the institution of unilateral collapse. Disease is treated by collapse and when this "burden" present before collapse is removed in part, and the better lung rarely ever fails to improve. In unilateral collapse it is exceedingly rare to see progression of disease in the better lung, and almost always one sees contralateral improvement and, indeed, rapid improvement, if the proper amount of collapse can be given for the better lung.

Certainly many of the fears, doubts and wishy-washy words that have arisen concerning collapse therapy have arisen because many

have attempted collapse therapy who do not know the many details of the proper management of pulmonary collapse, and also the care of complications and difficulties which may arise.

While man has been endowed with six to twelve times the amount of lung volume necessary to carry on respiration without embarrassment while at rest in bed, nevertheless, many other factors besides apparently normal anatomical lung volume are concerned in respiration. Among other factors, we are interested in the cardio-vascular system, mobility of the leaflets of the diaphragm, the mobility of the thorax, and the condition of the bronchial system.

The toxæmia, tendency to further infection, cough and fever improve with unilateral collapse if the case is not a hopeless one at the outset of treatment. This improvement is still greater if mechanical rest is given by the proper type of contralateral collapse.

Let us hope that bilateral therapy will not have to suffer the same neglect given to unilateral collapse by all but a few men for more than thirty years.

REST IN THE TREATMENT OF PULMONARY TUBERCULOSIS (Continued from page 14)

the chest wall these means have been of doubtful value and have been largely replaced by methods intended to splint the diseased lung directly, especially by induced pneumothorax.

In this procedure, air is introduced into the pleural space and the affected lung compressed and held at rest. Although this method was advocated strongly more than a hundred years ago by Carson, it was brought to the attention of the medical world by Forlanini some forty years ago and has been in extensive use for the past twenty-five years. Many cases of induced pneumothorax which have been unsuitable because of adhesions, have been changed to suitable cases by dividing the adhesions, usually by an intra-pleural neumolysis.

During the past twenty years phrenicectomy has been used quite extensively. The

phrenic nerve on the affected side is crushed or cut and several inches removed. This brings about varying degrees of relaxation of the diaphragm on the affected side, with some measure of rest for the diseased lung.

A great advance in treatment in Pulmonary Tuberculosis during the past two decades has been in the field of surgery. In many cases where pneumothorax is indicated but is impossible because of adhesions, and for some other conditions, segments of the ribs are removed and the entire chest wall is compressed, compressing the diseased lung. These operations do not attack the tuberculous process directly, but help bring about an arrest of the disease by relaxing the lung and emphasizing the amount of rest to the diseased areas.

Chemotherapy In Tuberculosis

THE AGE-OLD HOPE of humanity for a "remedy" which will *cure* tuberculosis has not yet been realized

This fact should not lead us dogmatically to declare that such a drug, compound or method will never be found, or that none of the various chemical substances available today are of any use in treating tuberculosis. A very large percentage of tuberculous patients at some time or another in their tuberculous careers are proper candidates for some form of mechanical attack. However, there are certain pulmonary conditions as well as some tuberculous complications in other parts of the body which can be favorably influenced by chemotherapeutic attack. Although gold sodium thiosulphate, Sanocrysin, by no means answers the definition of a "Therapia magna sterilisans," it does yield definite benefits when carefully used in certain conditions.

To attempt to even allude to all the various drugs and compounds which have been considered or tried in treating tuberculosis would require a small sized volume and in the interest of decent brevity of discussion will be limited to Sanocrysin. This substance seems to be the most effective of any of the numerous compounds of gold which were made, following the discovery by Koch that gold cyanide showed very great inhibitive powers against the tubercle bacillus in test tube experiments. The bacteriostatic powers of Sanocrysin are disappointing and exceeded by quite a number of other compounds. It seems to act, in the human and animal body, by stimulating certain cellular responses which result in acceleration of the healing process, rather than by any retardation of bacterial growth.

As might be expected from experiences with compounds of other heavy metals, some care must be exercised in the clinical use of gold sodium thiosulphate. The patients must be selected with care and certain precautions must be observed during

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its use. The existence of demonstrable renal damage constitutes an absolute contra-indication to the use of

Sanocrysin. During a course of treatment with this compound, the urine should be examined frequently for the presence of albumin, and the appearance of albuminuria is a danger signal which calls for great caution in continuing the use of the drug. If the albuminuria persists, treatment with gold sodium thiosulphate should be discontinued. A slight transient albuminuria, appearing twelve hours following an injection and clearing promptly, is found occasionally and is of no particular significance.

Patients with bowel tuberculosis do not tolerate Sanocrysin. Some of the gold is eliminated through the liver and bile passages where it may have an action similar to that of calomel and thus aggravate an existing tuberculous diarrhea. Again some patients manifest an intolerance to gold sodium thiosulphate by the appearance of an erythema. This may vary from a mild itchiness with very little redness to a severe exfoliative dermatitis, the latter usually following only the rather large doses. In my experience it has become necessary to discontinue the use of the compound when any skin irritation makes its appearance. Attempts to resume the use of the drug after a rest of several months or even a year were immediately followed by a reappearance of the dermatitis. Apparently a patient who becomes sensitized to the drug remains so.

Sanocrysin has not given us any results in promoting the disappearance of pulmonary cavities and collapse therapy has so definitely proven its value that no other method of attack on cavities should even be considered. On the other hand, infiltrations which have not yet broken down often show surprising retrogression and absorption under treatment with gold sodium thiosulphate. Along with improve-

ment in the lesion itself, we often see a marked change for the better in the general condition of the patient with lowered temperature, increased appetite, and strength. The drug seems to act as a detoxicating agent and at the same time elicit a cellular response which was lacking prior to its administration. Later, if some breaking down and cavitation do occur collapse therapy may be employed. The most striking result I have seen following the administration of Sanocrysin occurred in a patient with an upper lobe tuberculous pneumonia, a condition in which collapse therapy could not be used.

There are certain tuberculous complications which also respond favorably to gold therapy. Tuberculous otitis media will often clear up quite promptly under such treatment without any local treatment other than simple cleansing of the ear. Incidentally, when such cases are complicated by a co-existing secondary infection local use of 1% gentian-violet solution will usually get rid of the secondary infection quite rapidly. This is best applied by filling the auditory canal with gentian-violet solution, the patient lying on the side with the affected ear up. Tuberculous laryngitis is also frequently very favorably influenced. In discharging fistulas from suppurating tuberculous glands the healing process is usually markedly accelerated. I have not had an opportunity to use gold sodium thiosulphate in cases with discharging fistulas from the bone or joint lesions, although there seems to be no reason why this compound should not be useful in such conditions. The most striking results

with gold therapy are found in certain types of lupus.

Gold sodium thiosulphate is administered intravenously. The drug dissolves readily in distilled water at body temperature. It is advisable to give 50 milligrams as a preliminary dose to be sure the patient can tolerate the compound. If there is no reaction, that is, no albuminuria, erythema or constitutional reaction, the next dose can be increased to 100 milligrams. Some writers advocate increasing the dose as rapidly as the patient can tolerate it to as high as 500 milligrams or more. Naturally, any reactions to these larger doses were quite severe, and might prove disconcerting in private practice. In my work I have found that I get satisfactory results with smaller doses, 100 milligrams twice a week for six or eight weeks and then 150 milligrams once a week thereafter. The treatment is continued until a total of four or five thousand milligrams have been given. It is well to stop the treatment then for several months, resuming it again if conditions seem to warrant it.

It must be distinctly understood that Sanocrysin can not take the place of the generally accepted forms of treatment of tuberculosis. Its field of usefulness has very definite limitations and it is by no means the "cure" its introducers hoped it might prove to be. It is only an adjunct to the recognized methods of treatment, but, when used as such and when its limitations are kept in mind, the results following its use are well worth while and make it a real addition to our present measures.

CLIMATE IN ASTHMA

(Continued from page 16)

which at times purely asthmatic symptoms, and much more frequently, the symptoms of the complications of asthma are relieved by a change to a favorable climate. I have my theories and guesses, but I cannot offer a proved scientific explanation. I do believe, however, that the observations as to the fact that they are so relieved of many disinterested as well as interested people, trained and untrained, may reasonably and scientifically be accepted as of value. I know, likewise, that such benefit is not always secured. I, too, am humbled by my failures. But I am sure that in a reasonable number of cases, under proper conditions and with cooperation between

the referring physician, the patient, and the physician to whom he is referred, the patient does benefit so greatly, that I am impelled to urge strongly that we should not, in a laudable enthusiasm for proved scientific laboratory work, neglect means and methods which have, for many decades, proved their worth.

Climatic advantage is not always, or perhaps usually, the absolute essential—sometimes it is—but more frequently it is a great and valuable adjuvant, and should be more widely used as such and before the patient's condition is hopeless.

Surgery of Lung Tuberculosis

PULMONARY TUBERCULOSIS spreads by one of four methods

BY
CARL H. GELLENTHIEN, M. D.
Valmora, New Mexico

c Intrapleural Pneumolysis—the division of adhesions with the cautery under direct vision

1 Bronchogenic—a spilling of the sputum and pus into uninvolved lung areas

2 Contiguity—by direct contact and extension

3 By the blood stream

4 By the lymphatics—and the lymph flow is largely dependent on the movement of the lung

Surgery of pulmonary tuberculosis is based on

1 The principle of producing lymph stasis by immobilizing the lung and so preventing the spread of the disease

2 On the idea that by having the lung collapsed, a bronchogenic spread or spilling of the sputum is less apt to occur

3 On the principle that cavities will heal more readily if the cavity walls can be approximated

4 That if a diseased lung can be made to rest, it will perhaps heal

Lack of space prevents a full discussion of the different surgical methods, many of which are of questionable merit. The procedures, however, which have widespread acceptance and are known to be of established value with a superior background of experience, are artificial pneumothorax, intrapleural pneumolysis, phrenic neurectomy and thoracoplasty.

The various surgical methods are

I The direct compression of the lung by the injection of some substance into the pleural cavity

a Artificial Pneumothorax—the injection of sterile air or nitrogen into the pleural space

b Oleothorax—the injection into the pleural space of either olive oil or liquid paraffin to which two to five percent of oil of gomenol has been added. Gomenol is an essential oil distilled from *Melaleuca viridiflora*, a species of myrtle. It is not toxic or irritating and is bactericidal for common pathogenic micro-organisms.

through the thoracoscope or by open operation

d Extrapleural Pneumolysis—stripping the parietal pleura from the chest wall in the desired area and packing the space with solid paraffin, wax, pectoral muscle or a rubber bag

II Paralysis of the diaphragm on the affected side. To limit respiratory movement and produce compression of the lung by forcing the diaphragm up on the affected side, through abdominal pressure

a Phrenic Nerve Interruption—Temporary—Permanent

III Direct reduction in size of half of the thorax by removing portions of the ribs

a Extrapleural Thoracoplasty—Complete—Partial

1 *Paravertebral*—the excision of a segment from the posterior end of each rib as close to the transverse process of the vertebra as possible and including all ribs except the twelfth. This is the operation most commonly done.

2 *Subscapular*—this differs from the paravertebral in the greater length of rib removed and the non-interference with the eleventh rib. This operation is not commonly done. Besides the increase in shock, the regeneration of bone and later fixation of the ribs is usually incomplete, making it necessary for the patient to wear a support for the rest of his life.

3 *Antero-lateral costectomy*—removal of enormous segments of ribs

4 *Parasternal*—the resection of the cartilages and anterior ends of the first to the fifth ribs. Usually from two to nine centimeters is removed subperiosteally. The chest is then firmly collapsed with adhesive until it has become fixed in the collapsed position.

IV Paralysis of half of the thorax on

the affected side to limit respiratory movement

a *Multiple intercostal neurectomy* — Temporary—Permanent

b *Scalenectomy*

V Drainage of the pulmonary cavity—Direct external drainage in the manner that pyogenic abscess cavities are sometimes drained has not met with success often enough to counteract the many failures

VI Pneumectomy—lobectomy The actual removal of diseased tissue has been attempted from time to time. There have been occasional successes, but the operative mortality in general has been prohibitive

Intrapleural pneumolysis, intercostal neurectomy, scalenectomy and direct cavity drainage are applicable in but a few selected cases

At present, surgery is almost a fad. The unbounded enthusiasm in some quarters for the surgical measures today, the apparent abandon and ease with which pneumothorax, phrenic neurectomy, thoracoplasty, and the other less common procedures are advised and done with the thought that nothing else is necessary strikes one with the fact that the medical profession is just as unstable and has just as difficult a time to keep both feet on the ground and pursue a sensible course as the cranks and faddists of the laity

Artificial pneumothorax, phrenic exeresis, thoracoplasty, and all of the other surgical procedures are but measures to put the lung to rest. They become radical

measures, however, and are unnecessary in the great majority of cases if the diagnosis is made early enough

With any form of treatment as climate and surgery, there are enthusiasts who regard surgery as the whole of the treatment, who advocate it on any and every occasion and think no other treatment necessary. On the other hand there are still a few die-hards who deny that surgery has any value at all

If one appreciates the purpose of surgical treatment, it is possible to avoid either of these extreme views, and to find in surgery one of the most valuable and effective weapons against pulmonary tuberculosis, and at the same time recognize its limitations

The number of cases of tuberculosis requiring surgical intervention is not high—possibly not over one percent—when one considers the sum total of infected individuals

It should be emphasized that the use of any surgical procedure does not diminish the importance of the sanatorium regime. Collapse therapy is confined purely to the pulmonary lesion—only one factor in the treatment of pulmonary tuberculosis—while the sanatorium routine seeks to bring the patient to the highest possible state of physical fitness. It must be remembered that after the lung is collapsed, it must still heal. A modern sanatorium should be equipped for cases requiring every type of collapse therapy, so that these therapeutic measures may be carried out under ideal conditions

THE TREND OF COLLAPSE THERAPY IN TUBERCULOSIS

(Continued from page 7)

tion of thoracoplasty as a partial procedure, especially with cavitation near the apex, when other collapse aids have proven ineffectual, and during the past two years some have advocated a selective type of bilateral surgical collapse or apical thoracoplasty for a small group with cavitation in each apex as a last resort procedure, when the patient's physical condition justifies such radical intervention

In closing, it is evident that the concept of collapse therapy is a sequence of procedures in the treatment of tuberculosis in

addition to the fundamentals of rest, fresh air and nourishing food, the more radical being invoked as soon as the simpler ones have demonstrated their inability to cope with the problem presented

The wide prevalence of pulmonary tuberculosis and its leading death rate illustrates forcibly the magnitude of our problem in its treatment, and the dark path of disease was never more brightly illuminated than by the life-saving merits of collapse therapy



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SAMUEL H WATSON, M D
Medical Director

X-RAY IN TUBERCULOSIS

is put upon fluoroscopic findings in pulmonary parenchymal disease in some localities. Only the gross lesions are well defined fluoroscopically, and one is never justified in telling the patient he has no pulmonary disease from a fluoroscopic examination alone. This could be justified to some degree if we did not have the much superior film method of diagnosis.

For the case showing one good lung and a heavy fibrosis on the opposite side, Sampson's recently published method of double exposure offers many advantages, as both sides can be properly penetrated to give the necessary detail. This is done by covering in succession the right and left side of the cassette and making a stereoscopic film of the two sides separately. This is a distinct advantage in following thoracoplasty work.

(Continued from page 13)

It is hardly to be expected that all clinicians can become expert in the interpretation of chest films, yet it is very desirable that they have some knowledge of this subject. If they expect to do good work, it is even more essential to them to have good clear films, than it is to the radiologist who sees films day after day. In turn, it is too much to expect of the radiologist that he have an intimate knowledge of the physical signs and symptoms of the chest disease. For these reasons, close cooperation between the clinician and the radiologist is most apt to work to the patient's advantage. It is only where this type of cooperation is impossible that either clinician or radiologist is justified in taking upon himself the double duty.

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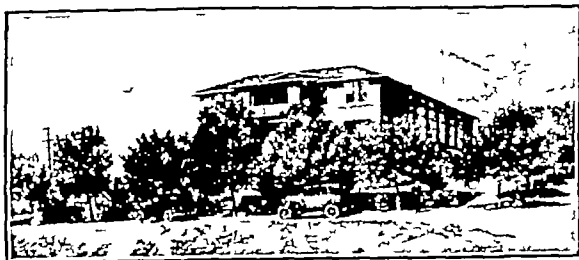
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When writing please mention DISEASES OF THE CHEST



NEW MEXICO

with the compliments of the

FEDERATION of AMERICAN SANATORIA

First Annual Meeting of the Federation at Albuquerque, N M

AUGUST 10, 1935

This issue of DISEASES OF THE CHEST carries New Mexico's message to THE FEDERATION OF AMERICAN SANATORIA. Each year the editors plan to make the annual meeting issue a number devoted to the particular state or region in which the meeting is held.

It is the desire of the men who formed this organization that it be national in scope and not limited to any locality or section of the country.

THE FEDERATION shall in no way encroach upon the work of *The American Sanatorium Association* or the *National Tuberculosis Association*, but on the contrary hopes to cooperate in every way.

Neither shall DISEASES OF THE CHEST infringe upon the work of *The American Review of Tuberculosis*. The one is a journal of information on chest diseases for the general practitioner, while the other is a scientific publication for spe-

Foreword

BY

LE ROY S PETERS, M D
Albuquerque, N M

cialists in tuberculosis. The object of DISEASES OF THE CHEST, the official organ of the FEDERATION, is to bring to the medical profession information and methods relative to the proper

diagnosis of early tuberculosis.

The sole object of this FEDERATION is to bring men together in one line of practice and to attempt to show the medical profession the need of placing patients with tuberculosis in Sanatoria or under proper supervision.

The meeting in Albuquerque is for the purpose of discussing these objects and to strengthen the existence of the FEDERATION OF AMERICAN SANATORIA.

As Chairman of this Albuquerque meeting, I ask that all men interested in tuberculosis work make every effort to attend, and I also extend a cordial invitation in behalf of the members here and the City of Albuquerque.

STATE OF NEW MEXICO

EXECUTIVE DEPARTMENT
SANTA FE

CLYDE TINGLEY
GOVERNOR

W. H. McMAINS
SECRETARY

July 12th, 1935

Dr. L. S. Peters,
First National Bank Bldg.,
Albuquerque, New Mexico.

Dear Dr. Peters:

Through your committee on arrangements for the convention of the Federation of American Sanatoria, I would like to extend a word of greeting to the members of your association and to bid them welcome to New Mexico next month.

For many years New Mexico has been "selling" climate to the world, and I feel that a meeting of doctors in New Mexico will help to clinch our argument that New Mexico has an ideal climate in which to "chase the cure." As you may know, Mrs. Tingley came to New Mexico for her health twenty-five years ago.

New Mexico welcomes the health seeker. Hundreds of them who have come here in years past are today enjoying good health and are prominent in the business and public life of the state.

I hope that there will be a large representation of doctors at the convention, that they will like Albuquerque and New Mexico, and that many of them will find the time to tarry a while and enjoy New Mexico's facilities for outdoor vacations and scenic tours. We enjoy having visitors and we hope they will like us.

With all best wishes for the success of the convention, I am

Sincerely yours,

(Signed) CLYDE TINGLEY
Governor.



In the Palace of Carlsbad Caverns

New Mexico— Land of Enchantment

BY

GEORGE FITZPATRICK

Editor, New Mexico Magazine

Advertised as the Land of Enchantment, New Mexico every year is becoming more and more a mecca for tourists, vacationists, hunters, fishermen, artists, writers and students as they seek to discover for themselves the enchantment that is New Mexico.

With a variety of climate that varies from the southern deserts to the high mountain peaks, New Mexico offers a variety of outdoor appeal.

To the fisherman there is the appeal of countless mountain streams, abounding in trout. There is Eagle Nest Lake with its five pound trout, Elephant Butte Lake with its five to nine pound bass, as well as crappie, bream, catfish, perch, other warm water lakes and streams.

To the hunter there is the appeal of duck and goose hunting up and down the Rio Grande, one of the three main migration routes for waterfowl in North America, the greatest deer hunting areas in America, an abundance of turkey, lion hunting, bear hunting, antelope and elk hunting.

To the student, writer, and artist there is the blending of cultures, Indian, pre-historic, and modern, Spanish, and Anglo, a variety of historic settings, unusual opportunities for research, much to paint, much of "atmosphere."

For the healthseeker there is delightful, dry climate with sunny skies—ideal conditions for outdoor rest.

For the average vacationist, sight-seer, or general outdoorsman, the opportunities for enjoyment are unlimited.

There are the National Forests with their opportunities for camping, hunting, and fishing, Indian villages with the picturesque dances and ceremonials, the national parks, such as Carlsbad Caverns, national monuments such as Frijoles Canyon and its pre-historic Indian cliff dwelling ruins.

There are the other pre-historic Indian ruins such as Chaco Canyon, Gran Quivira, Puye, Pecos. There are old forts and battlefields, old Spanish missions, old Spanish towns. There are the fiestas, the rodeos, the Indian celebrations.

August is a month of Indian dances in New Mexico, and the visitor finds many of the pueblos within easy driving distance

of Albuquerque. A few of the dance ceremonial dates are Picuris, August 10, Santa Clara, August 12, Zia, August 15, Isleta, August 28.

In August, too, is presented the Intertribal Ceremonial at Gallup when on August 28, 29 and 30, six thousand Indians from western New Mexico gather for dances and sports. In three days and nights the visitor may see more of Indian life than if he traveled for a year over the reservation.

Following the Gallup ceremonial is the Santa Fe Fiesta on August 31, September 1, 2 and 3. In the Ancient City the Fiesta is given annually and is participated in by the entire community. The only celebration of its kind in America, it attracts thousands of visitors. Townspeople and visitors dress in Spanish costume and make merry for four days.

Each year thousands of visitors come to New Mexico to see the Carlsbad Caverns. The great spectacular underground wonderland this year is more popular than ever, and a new record for the number of visitors is expected to be set. Last month more than 12,000 persons visited the caverns.

Increasing in popularity as an attraction for tourists is El Morro, southwest of Grants. On the sides of the cliff rock are inscribed the records of the Early Spanish conquerors. The oldest inscription that may still be read is that of Don Juan de Onate, the first governor and colonizer of New Mexico, who camped at the rock in April, 1605. In all there are inscriptions of twenty-seven parties of Spaniards.

Enroute to El Morro from Albuquerque many visitors stop at Acoma, the Sky City. High up on the rock mesa is the old Indian pueblo and the Acoma mission. Every ounce of dirt that went into the buildings had to be carried over a tortuous trail to the top of the great mesa. The Indians of Acoma give their annual dance ceremonial on September 2. Between Albuquerque and Acoma are the pueblos of Isleta and Laguna.

But whether the visitor goes north, south, east or west out of Albuquerque there is much of interest to be seen, much to hold his attention for an hour, a day or a week.

It all goes to make New Mexico—the Land of Enchantment.



Jackie Googan meets Chief Hosteen Yazzie, Medicine Man

Indian Mythology and Medicine

BY
HERMAN SCHWEIZER
Fred Harvey System

Indian Mythology or the religious history of some of our Indian Tribes seems to me in many respects very similar to that of other races. From all my observations there is a great similarity in all essentials.

Mythology, or to put it more plainly, the early history of any or all races is religious, or I might say more correctly, orthodox in character. Wherever orthodoxy has survived there seems to me great similarity in present day practice, whether Christian, Hebrew, Hindu, Mohammedan or Navajo or Pueblo Indian.

The belief, practice or dramatization of some religious rite or custom is based on certain events which presumably occurred in a certain way in the far distant past at the dawn of this or that particular religion or race consciousness.

The orthodoxy of various Christian faiths seems more tangible because it is more recent, perhaps more advanced and

because of the existence of more clearly written records in all of the languages of Western civilization.

Yet, even in this, as you are aware, advanced education has brought many changes. It would appear that fear of the supernatural or unknown by the ignorant, uneducated mass was the means of enforcing some practical law by all of the wise men of their time.

Some of the laws of Moses in the old testament such as sanitary regulations expedient at the time they were given and promulgated as religious observances, have been superseded by sanitary knowledge among all civilized peoples.

Likewise the proceedings at the death of a Navajo Indian when religiously observed, are virtually like a modern quarantine regulation.

The practice among certain tribes of cremating the remains of the dead with all their belongings, or the burial with all

their effects seems to me, no doubt at least partly, based on the early knowledge of contagion

A Navajo will never live in or even enter a house where death has occurred. They fear the dead and do not go near them, a fear taught them perhaps for the same reasons.

According to their old custom when a Navajo dies, all the family immediately abandon the house. Certain watchers are appointed. These watchers leave off their clothing and smear their bodies with lime and ashes. They watch over the dead, part of the time chanting a death song. No one goes near. Food and firewood for the watchers is left at some distance by relatives of the deceased. At the end of the proper time the watchers bury the dead with all personal jewelry, although new clothing is furnished by relatives. The place of burial is kept secret. After the burial there are some ceremonies by the medicine man, who acts in the dual capacity of high priest and physician. The watchers walk over sacred corn meal to a lodge or sweat house for a complete and final cleansing. No one goes near the watchers until they emerge from the sweat house.

There seems to me very little doubt that some Moses in the early history of the race made this law in the knowledge or suspicion of contagion and it was handed down through the ages as a religious observance.

A story in the old Testament has made the snake an outlaw among the White Race. The Hopi Indians hold the snake in reverence. There is a myth based on various events supposed to have occurred in the long ago, that the snakes are in communication with the gods of the underground. At the annual Snake Dance the snakes are gathered up from the four corners of the earth.

After the snake ceremony they are again liberated to carry back the prayers of the people.

You all know the story of Daniel in the Lion's Den. There is a legend among the Navajo about the eagle. The eagle as well

as the snake is sacred among the Navajo. A Navajo will never kill an eagle or hold him in captivity.

According to the story, one of their great ancestors, when the Navajo first came here from the North, was captured by the Pueblos and imprisoned in a small corral. One day an eagle came along and the Navajo told him he was thirsty and the eagle brought water in his beak. Then the Navajo told him he was hungry and the eagle brought food. After the Navajo partly regained his strength he told the eagle he wanted to go home to his people. The eagle left and shortly returned with five other eagles.

They picked up the Navajo on bands of lightning and started for his home. Getting tired on the way the eagles asked their friends, the snakes, for help. The snakes said they could not help because they had no legs or wings. Then the eagles plucked out some of their feathers and gave them to the snakes, who helped the Navajo the rest of the way home.

There are many stories and myths about plumed snakes.

There are many different myths about the origin of various tribes.

Some of these seem no more fantastic than the story of Adam and Eve, Jonah and the whale, or Noah's Ark.

The Navajos believe that their first ancestors were giants who rose out of the waters of the Pacific. Most scientists agree that the Navajo is of Mongolian origin and perhaps came across the Pacific probably at Behning Straits.

The Adam and Eve of the Hopis was a man on a mountain and a woman called the "Spider Woman" on another mountain, the intervening space being covered by water. In some way one joined the other. At the same time there are many other myths, for each separate blood clan within the tribe have somewhat distinctively separate legends.

The religion of the Hopi peoples is somewhat similar to the ancient Greeks. It is founded on what is commonly called the Katchina Cult. The Katchinas were

(Continued to page 42)



New Indian Sanatorium Albuquerque, N. M.

The Albuquerque Indian Sanatorium

BY

A J WHEELER, M D

Director

The Albuquerque Indian Sanatorium was constructed in 1933 by the Field Service of the United States Indian Service, from funds furnished by an Act of Congress. It was opened for the admission of patients in March, 1934.

The building is situated on a 15 acre tract north and east of the University of New Mexico. It is a modern fire proof four story building. The two top floors are for wards and private rooms of patients. Each of these two floors is provided with two sun decks.

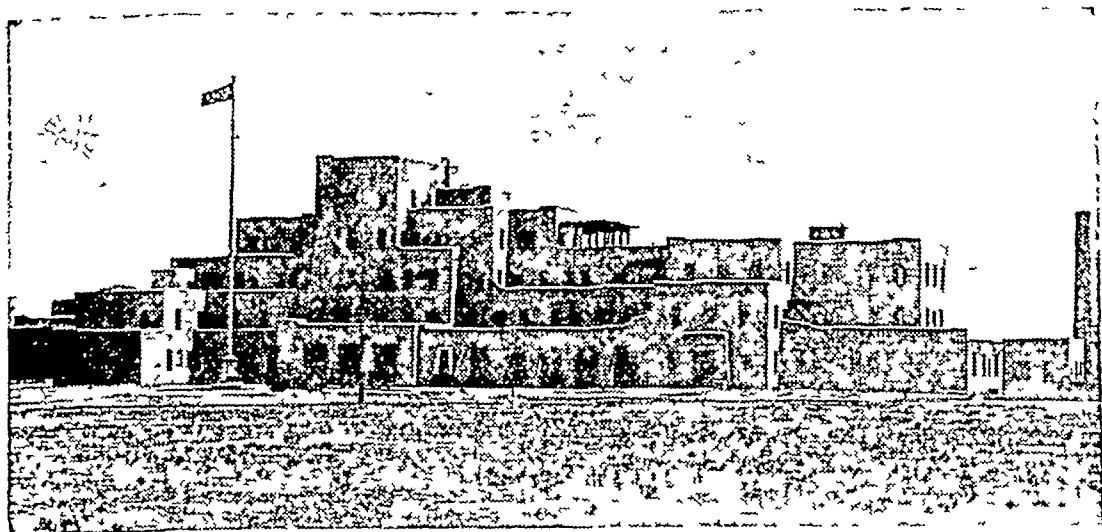
The first floor takes care of general and private offices, laboratory, operating suite, x-ray department, eye, ear, nose and throat department, dental office, physiotherapy, occupational therapy, and library. Dining rooms and kitchen services occupy the middle wing of this floor. The first floor or basement affords ample storage facilities.

The building is heated by natural gas, has elevator service, and is served by city water, sewer and lighting facilities. Each bed is fitted with the usual call system and in addition each patient receives radio programs

by ear-phone through a central receiving station. The building is cleaned throughout by a central vacuum system so that no sweeping is necessary.

This sanatorium was designed and is now being used for the treatment of tuberculous Indian wards, general cases being handled by the Albuquerque Indian School Hospital. In this connection both of these hospitals are now being merged by Mr. John Collier, Commissioner of Indian Affairs, into the United Pueblos Indian Agency with headquarters in Albuquerque, and under the superintendency of Dr. Sophie D. Aberle. Dr. D. S. Duncan is assistant director of the sanatorium.

The majority of the patients so far admitted have been from the Navajo and Pueblo tribes. Sanatorium service with these tribes is yet in its infancy, and such procedures as pneumothorax, phrenicectomy and thoracoplasty are to them quite new. They are accepting sanatorium treatment in increasing numbers and the acceptance of the "new" procedures by them after careful explanation as to what may be expected has been very gratifying.



Veterans Hospital Building Albuquerque, N M

Veterans' Administration Facility

BY

C. H. SMITH, M D

Chief Medical Officer

The Veterans' Administration facility at Albuquerque, New Mexico, is located on a tract of 515 acres on the mesa five miles east of the center of the city. It is known as a combined facility having been constructed and equipped for conducting the business and financial affairs of the Veterans' Administration as well as for maintaining a general hospital with a 259 bed capacity. The construction of this institution was begun in 1931 and completed in 1932 at an estimated cost of \$1,250,000. The architecture which is in beautiful harmony with the prevailing Indian culture was inspired by the famous pueblo of the Taos Indians. The facility here is allocated to all of New Mexico and parts of Texas, Colorado and Arizona. It is available for the examination and treatment of honorably discharged ex-service men of all wars in which the United States has been engaged. The complete hospital unit consists of the following buildings: the general administrative building, tuberculosis pavilion, mess hall, recreational building, nurses quarters, attendants quarters and four single quarters for the administrative officers of the hospital. The first patient

was received on August 22, 1932, and since that date 3580 admissions have been made.

The general hospital, a four-story building, contains 153 beds for the treatment of general medical and surgical cases. On the first floor in addition to the usual administrative offices are located the x-ray and clinical laboratories, the dental, and eye, ear, nose and throat clinics. The general medical ward and the receiving service of the hospital are located on the second floor, and on the third floor, in addition to the medical and surgical ward, there is an isolation ward which may be entirely shut off from the remainder of the hospital if an emergency exists.

On the fourth floor is located the surgical unit. It consists of two operating rooms, sterilizing room, utility room, preparation room and anesthesia room, nurses' and doctors' offices and eight single rooms with adequate toilet facilities for the use of immediate postoperative treatment. This is modern in all its appointments.

In the basement of this building is located the extensive physiotherapy department consisting of electrotherapy agents

and hydrotherapy in its various forms. There is a well equipped genitourinary clinic on this floor and also an electrocardiogram and a basal metabolism machine. The morgue of the hospital is also located in the basement, a large, well lighted, airy room. For the past several months great interest has been taken in this department of pathology, the autopsies running well over 50%.

Upon admission to this hospital all patients pass through the reception service in which they are examined, classified, then transferred to the ward appropriate for the rendition of proper treatment. All necessary routine laboratory work is performed on this ward and consultations with the various specialists in this hospital are made on the request of the receiving officer. A dental examination and examination of the eye, ear, nose and throat are also routine.

Staff conferences are conducted daily both on admission and interhospitalization cases and each patient who is discharged is required to appear before the staff conference where his case is carefully and fully discussed. In addition to the in-patient activities which have been described, there is also an out-patient department to which all applications for hospitalization are made and by whom the necessity of hospitalization is determined and such treatment as is indicated is rendered to service connected cases.

For the care of tuberculous patients there is a three-story building containing two wards, a 66 bed infirmary ward on the first floor, a 40 bed ambulatory ward on the second floor and also a large solarium which is partly roofed on the third floor. It is equipped in the latest approved manner for the care of tuberculosis, having large diet kitchens with tile floors and equipped with monel metal. Long, spacious, screened porches surround the building. About 50% of the rooms contain two beds, the remaining being single rooms. Baths and toilets entirely finished in tile are conveniently located on each floor and the building is equipped with an automatic elevator.

The mess hall is a two-story structure on the first floor of which are located the supply receiving service and the refrigeration plant with ample cooling space. On the second floor are the kitchen and the dining rooms used by the staff, attendants, ambulant general medical and surgical patients, and the ambulant tuberculous patients. All the equipment in the kitchen is constructed of monel metal except the gas ranges which are steel. There are convenient ice boxes for the use of the chef as well as small storerooms in which supplies for the day are kept. Two complete dishwashing units have been installed in this kitchen, one for the general mess and dishes which are used by the personnel and the second, a smaller one adjacent to the dining room, for the use of the tuberculous patients. All the dishes from the tubercular dining room are washed and sterilized never finding their way into the kitchen of the general medical and surgical cases.

The recreational building is unique in that it is a replica of an ancient church located in the Indian village of Isletta. This church is reputed to have been erected over 300 years ago. The recreational hall is equipped with ample stage room and proper equipment for the various entertainments which are given. There is also installed a motion picture talking apparatus and pictures are shown on Mondays and Fridays of each week. These activities are in charge of an experienced aide. The recreational building also includes the canteen, barber shop, billiard room and writing rooms. It is reached from the administration and other buildings by covered walks.

The library, situated immediately in the rear of the beautiful main lobby of the administration building, is easy of access to patients and personnel. Like the recreational building, it has been planned and equipped to relieve the monotony of hospital life. The Veterans' Administration has provided a general library in charge of a trained librarian and a medical library for the use of the medical staff.

(Continued to page 42)



Main Building

History of the Southwestern Presbyterian Sanatorium and Hospital

by HUGH P COOPER Superintendent

The Southwestern Presbyterian Sanatorium and Hospital of Albuquerque New Mexico was founded in August, 1908, by the Synod of New Mexico of the Presbyterian Church of the United States of America. The late Reverend Hugh A Cooper was instrumental in the building of the institution. In 1911, the first sanatorium building was erected, as shown in the picture above. Later came the Minister's memorial cottage built by the ministers of the Presbyterian Church. A fine patients' building was given by Mrs Cyrus McCormick, Sr and later a McCormick service building to house the dining room and kitchen was added. In 1919, the Harbison Cottage was built and in 1925, the Hazeltine Infirmary for those needing additional care. Mr and Mrs William E Hazeltine of San Jose, California, gave the last ten thousand dollars towards the erection of this building. In 1928, a splendid nurses home able to accommodate twenty nurses was added to the already fine array of buildings. In 1931, the Maytag Tuberculosis Research Laboratory was built and the latest addition was a new hospital building fully equipped with the latest General Electric X-ray machine

and all modern operating and clinical facilities.

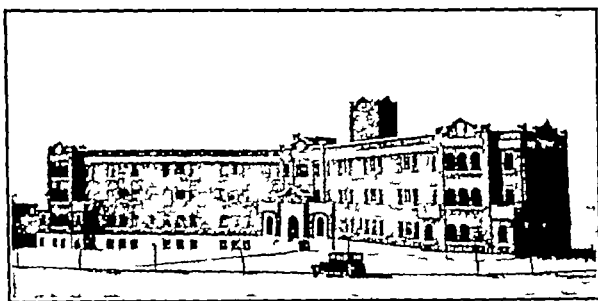
The Southwestern Presbyterian Sanatorium and Hospital is to-day one of the finest of hospitals in the Southwest and patients can be accommodated for sixty dollars per month for a room with running water, sixty-five dollars for a room with porch and running water, seventy-five dollars per month for a room with porch and private bath, and a few choice rooms at a higher rate. All of the above rates include the best of food and nursing attention by graduated registered nurses. Medical attention is extra and the patients are at liberty to choose their own physician.



Garden View

St. Joseph's Sanatorium Here in 1902

By SISTER HENRIETTA MARIA, *Superintendent*



Main Building

There is a regular ritual followed by all loyal citizens of Albuquerque, when showing off the town to a visitor. Invariably the car will start up East Central, and in a few blocks turn left, into a shady street lined by pleasant homes. Straight by the Junior High they will roll, with its green lawn, and enter into a quiet thoroughfare that slips smoothly through a lane of bending trees. Here, set back from the street, they will see a group of imposing buildings with trees and flowers and vines, and an air of well-kept restfulness about the grounds. And then the car will slow up, the driver lean out with a swoop of an arm toward the buildings "This," he will say with a note of pride in his voice, "is Saint Joel!"

St. Joseph Sanatorium and Hospital, Albuquerque, New Mexico, is in charge of the Sisters of Charity of Cincinnati, Ohio, founded by Mother Elizabeth Bailey Seton, foundress of the American Sisters of Charity in the United States.

St. Joseph's was the first sanatorium and hospital in Albuquerque, opening its doors in 1902, at the request of old Doctor J. H. Wroth, to care for the sick of this region. The greater number of its two hundred beds were occupied by health seekers, whom the state's far-famed dry climate and perpetual sunshine had attracted to New Mexico from every part of the Union.

There are twenty-five Sisters, members of the faculty, in charge of the various offices, floors and departments. There is a Nurses' Training School in connection with St. Joseph Sanatorium and Hospital. At the present time there are twenty-six nurses in training.

Within the past five years, St. Joseph's built and opened a new 100-bed hospital for medical and operative cases, which is the most up-to-date modern hospital within a radius of two hundred miles. The old sanatorium building and cottages are used exclusively for tuberculous patients.

St. Joseph Sanatorium and Hospital is situated on a large tract of land at a considerable height above the city, in what is known as the Highlands District of Albuquerque. The elevation is almost 5,000 feet. Below, and to the west, one overlooks the city and the beautiful Rio Grande Valley, while above and to the east, abruptly rise the lofty Sandia mountains.

Beyond in every direction, the eye meets the distant perspective of towering mountain ranges. A bus line, one block distant, gives easy access to the business section of the city, about ten blocks away.

No expense has been spared in the construction of the buildings, cottages, etc. along the lines for which they were intended. Not only are they designed according to approved ideas of sanatorium architecture but an especial effort has been made to produce a cheerful and home-like effect, doing away with gloomy hospital impressions.

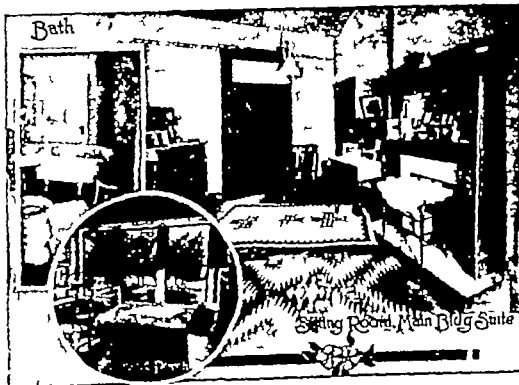
The main buildings are of brick, fire-proof, finished throughout in hard wood and with terrazzo floors. There is elevator service. All buildings, rooms and cottages are steam-



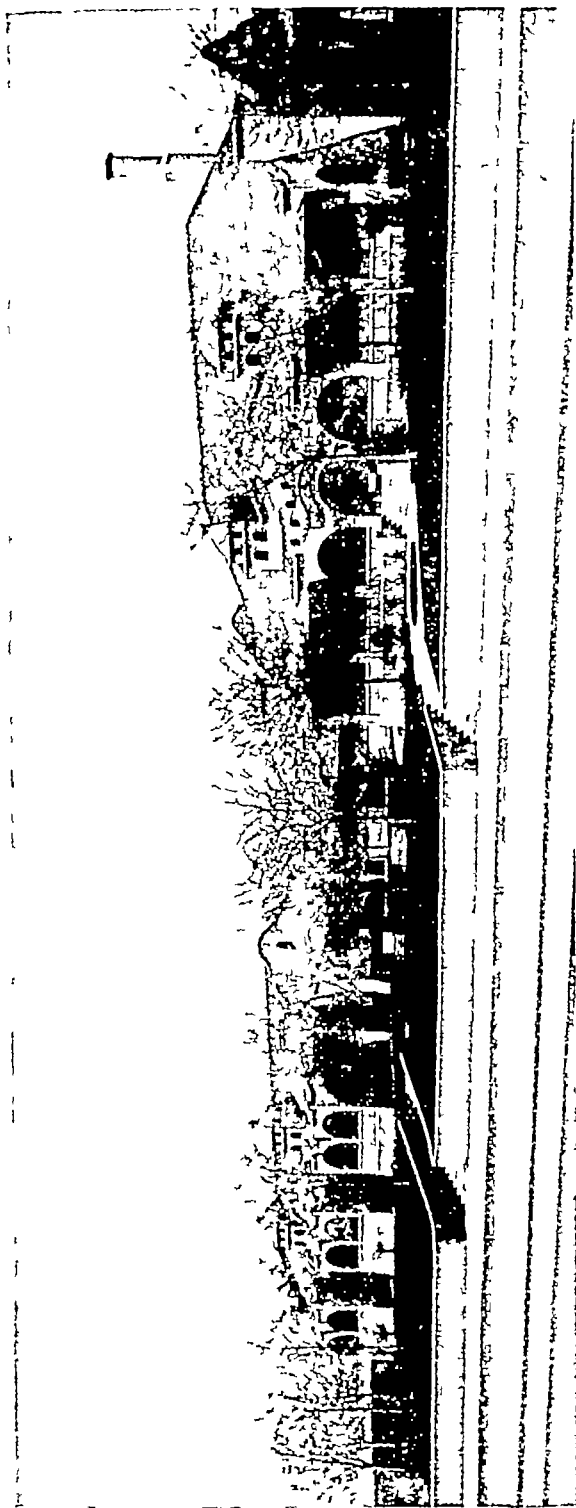
Entrance View

heated, screened, electric lighted and have electric call-bells.

Visitors are always welcome and a prospectus and rates cheerfully given.



Inside View of Room



Story of the Methodist Sanatorium, Albuquerque, New Mexico

by MRS MINNIE G. GORRELL, Superintendent

The Methodist Sanatorium was established in Albuquerque in September of the year 1912, by the National Women's Home Missionary Society of the Methodist Episcopal Church. The location first selected for the sanatorium was on the open mesa, east of the city and not far beyond the campus of the University of New Mexico. At this site, in its first years of existence, the patients' quarters consisted of only a few small cottages. In a very few years these proved to be insufficient for the growing demands upon the institution, and plans were made for the necessary enlargement. It was thought advantageous to move to the present location which was purchased

from Doctor J. S. Cipes. This location, well within the city limits, is at 1621 East Central Avenue about a mile from the downtown district of the city. The growth of the sanatorium continued with the demand for the increase of beds until now, it includes four large modern well-equipped buildings and fifty cottages surrounded by beautiful lawns and trees. A large central heating plant supplies heat and hot water to all of the buildings and cottages.

The panorama of the sanatorium affords a clear view of the majestic Sandia and Manzano mountains, whose summits are sometimes snow-capped,

and in the opposite direction, one can obtain a fine view of the city, for the sanatorium is well above the street level.

The sanatorium is close to the campus of the University of New Mexico and many patients who have arrested their disease but still require medical supervision are able to attend the university while residing at the sanatorium.

A homelike atmosphere is maintained at the sanatorium and registered nurses are in attendance at all times. The rates are moderate and include all services except medical attention. The institution is open to all qualified physicians

Pioneers of Medicine at Albuquerque

A Biographical Sketch of Physicians Who Helped to Build Albuquerque

This year, Albuquerque has celebrated its Golden Anniversary—fifty years since the Town of Albuquerque first incorporated and elected a Mayor and Councilman

In point of years and in comparison with other cities thruout the United States, Albuquerque is but a babe but this infant has been growing considerably during the past half-century Today it is a genuine modern city, yet unique in the make-up of its population Indians, Spaniards, Mexicans, and Anglos

Long before the incorporation of the Town of Albuquerque came those hardy pioneers in medicine, imbued with the spirit of adventure and moved by those inspiring words of Horace Greeley "Go West, young man, go West"

Doctor John F Pearce, by the Grace of God, is still with us, and can recall vividly those early pioneers days that tested man's mettle Shortly after graduating from the University of Delaware he made his way here along with other determined men 1883 finds Doctor Pearce in active medical practice in Albuquerque In 1885, Doctor Pearce tells us the first medical society in the state was organized and he was elected its first secretary Since then, he has served as president of both the state and county medical societies and for many years was a member of the State Board of Medical Examiners At the age of seventy five, Doctor Pearce is still hale and hearty and when he is not engaged in the practice of medicine, he is to be found telling stories of the adventures of Geronimo and the bad men of the wild west Doctor Pearce is related to Doctor Jonas Studham, who was the first doctor to practice medicine in New York Town in the seventeenth century Doctor Pearce is today, the oldest living physician practicing medicine in the City of Albuquerque

No history of early medicine at Albuquerque would be complete without a mention of Doc O. John P Kaster, who came from Kansas in 1886 and was identified with the old Atlantic and Pacific Hospital as its Chief Surgeon When the Atchinson, Topeka and Santa Fe Railroad was formed Doctor Kaster went with them as chief surgeon and to-day, at Topeka, Kansas, in the hospital of the A T & S F you will still find Doctor John P Kaster, in the same professional capacity

From Jefferson College at Pennsylvania came another young pioneer, Doctor Walter Geddie Hope Doctor Hope arrived at Albuquerque in 1891 and practiced medicine without interruption until 1928, when he retired at the age of sixty eight Doctor Hope was also president of both the state and county medical societies For the past seven years Doctor Hope has been living in California, but his family still resides in Albuquerque

These are the living pioneers of medicine at Albuquerque and we drink a toast to their continued long life and happiness Now, a word

about those splendid doctors, who were pioneers in medicine at Albuquerque and have since passed on to their reward

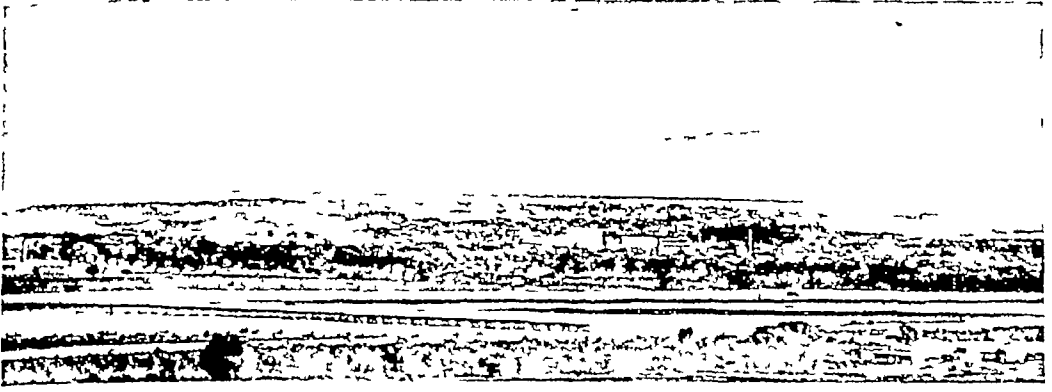
The oldest member of the medical fraternity of whom we have any record is Doctor George S Easterday Doctor Easterday graduated from the Cincinnati Medical College in 1879 and came to Albuquerque in 1881 In 1892, he was elected Mayor of the City of Albuquerque Doctor George Easterday passed away in February, 1924 His sister, Miss Frances Easterday, is still a resident of Albuquerque

In 1883, came Doctor James H Wroth, a graduate of the University of Pennsylvania Doctor Wroth, and a son, William B, still resides in Al- is said that he fashioned his own surgical instruments to fit the various types of operations he performed Doctor Wroth was instrumental in establishing the St Joseph's Hospital by the Sisters of Charity and served on their board for many years He was actively connected with many fraternal organizations He died in the year of 1924 His widow, Mrs Ella Forrest Wroth, and a son, William B, still reside in Albuquerque

The next doctor to come to Albuquerque was Doctor Jacob Spencer Easterday, a brother of Doctor George Easterday Doctor Jacob Easterday was graduated from the University of Louisville in 1894 and that same year joined his brother at Albuquerque, where they were associated in the practice of medicine He was a life-long member of the St Paul's Lutheran Church and served as president of the county medical society He died on Thanksgiving day in 1928 His widow and daughter, Margaret, survive him and are living at Albuquerque

In 1897 came Doctor Percy Gillette Cornish, who graduated from Jefferson College in 1884 In 1885, Doctor Cornish went to Flagstaff, Arizona, and in 1897 he moved to Albuquerque, where he became chief surgeon of the Atlantic and Pacific Railroad Doctor Cornish had the distinction of being the first member of the American College of Surgeons from the State of New Mexico He passed away in 1932 His son, Doctor Percy Gillette Cornish, Jr, is actively engaged in the practice of medicine at Albuquerque

In closing, let me say a word about Doctor A G Shortle, the first tuberculosis specialist in Albuquerque Doctor Shortle came to New Mexico in 1907 settling in Silver City He later went to the University at Heidelberg, Germany, for post graduate work and upon his return to New Mexico, he settled in Albuquerque and founded Shortle's Sanatorium, the first sanatorium to be established at Albuquerque, now known as the Albuquerque Sanatorium Doctor Shortle contributed a vast amount of literature on the subject of tuberculosis and was largely responsible for the building of Albuquerque as a health center He died from septicemia in 1922



Bird's Eye View of Albuquerque—Metropolis of New Mexico

A Message of Welcome from the Albuquerque Civic Council

BY

EDITH HICKS

Manager

It is particularly appropriate that Albuquerque should be selected as the meeting place for the formation of an organization of sanatoria for the hospitalization of the tuberculous, for Albuquerque is unusual if not unique in its attitude toward this disease.

In Albuquerque, the welcome which is extended to the visiting physicians and representatives of the management of sanatoria, will come not only from the organizations usually found in any city, but also from one which devotes its entire efforts to the inviting and welcoming of people afflicted with or interested in tuberculosis.

On behalf of the City of Albuquerque, we extend the welcome of the Albuquerque Civic Council, and as a matter of interest to the readers of *Diseases of the Chest*, we add a brief outline of the purposes and functions of this organization.

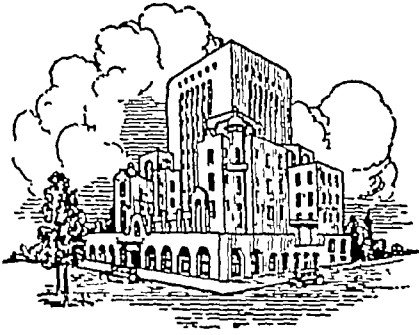
Those who are interested in the formation of an organization of sanatoria and of physicians treating and guiding patients in sanatoria appreciate, of course, the economic side of this question. Albuquerque, as a city long ago recognized the economic importance of the large number of healthseekers attracted here by our climate. In order to provide a means of disseminating accurate, authentic and honest information about the city to those seeking such information to guide them in choosing a place to take the cure, the Albuquerque Civic Council was formed.

The impetus for its formation came from the business interests of the city, and it was supported for the first two years of its operation by subscription from these interests. The organization has now functioned for ten years, and since the third year has been operated upon funds received by a special tax levy upon all city property. The same business men who organized the Civic Council secured the levying of this tax upon the basis that since the entire city shared in the income from those who come here for health reasons, all citizens should pay a share of the cost of maintaining this income by organized effort.

The Civic Council is directed by a board of nine members, one of whom is a physician, the others active in various businesses. It publishes and distributes booklets and folders giving complete information about the city from the angle of the healthseeker. It carries advertisements in magazines of general and medical circulation, calling attention to Albuquerque's climate and offering to send complete information upon request. It has written 133,000 letters to physicians in general practice over the country, offering information about Albuquerque, and has received requests for booklets and further information from 19,800 of them. These physicians asked that information be sent to 11,150 of their patients. The Civic Council meets healthseekers at the train and assists them to find the type of accommodations they desire.

The attitude of Albuquerque, as presented through the Civic Council to the world, is expressed in the advertisement appearing on the inside cover of this issue of *Diseases of the Chest*. This attitude is that Albuquerque considers its climate "not a cure for tuberculosis, but as additional armamentarium for the physician" with patients who fail to respond to the basic fundamentals of the accepted methods of treatment. Albuquerque also privately considers that in a disease as full of dangerous possibilities as tuberculosis, and one requiring such a length of time to arrest or cure, it is foolish not to use this additional armamentarium from the outset whenever possible. But this is beside the point. Albuquerque does not force this opinion upon anyone.

So far as our knowledge goes, Albuquerque is the only city in the world maintaining an organization of exactly this kind. It is the only city openly inviting the tuberculous in this way. We believe that these facts are expressive of the open-handed welcome Albuquerque offers to the tuberculous and we assure you, on behalf of our city, that this same welcome will be extended to you on every hand when you attend the first meeting of your group in Albuquerque this month.



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Bernalillo County Medical Society Greets Visiting Members of the FEDERATION OF AMERICAN SANATORIA

The Bernalillo County Medical Society was first organized in 1885, the same year that Albuquerque was incorporated as a Town

Since then, it has grown with the advancement of medicine at Albuquerque and to-day, with a population of 35,000 inhabitants, the County Medical Society has fifty-five members in good standing

Among the membership are physicians in every branch of medicine and specialists internationally recognized in their respective field of medicine

The members of the Bernalillo County Medical Society extend a cordial welcome to the visiting members of the FEDERATION OF AMERICAN SANATORIA and hope that their stay at Albuquerque will be both profitable and enjoyable

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INDIAN MYTHOLOGY AND MEDICINE
(Continued from page 31)

supposedly semi-supernatural beings who were the intermediaries between the people and the supreme being in the other world

Each clan has its own particular Katchinas or deities. The faith is perpetuated by certain individuals dressing up in special costumes and masks supposedly in the image of the long since vanished Katchinas.

They appear on definite dates (not unlike the saints in other faiths) going from house to house among the members of the clan. Here they sing and chant while offerings by the people of sacred meal and feathers on sacred trays are carried and deposited in their underground shrines.

Small wooden figures in the image of these Katchinas are prepared for these occasions and given to the children. In other words Santa Claus has copied the Hopi fashion.

Navajo Medicine Men

The Navajo medicine man is primarily a soothsayer and effects cures largely by legerdemain, invocations, sweat baths and physics.

On the other hand they seem to have considerable knowledge of many herbs of medicinal value known only to themselves.

Usually a medicine man hands down his knowledge to a single successor.

It would also appear they frequently exchange information with each other.

VETERANS' ADMINISTRATION FACILITY
(Continued from page 34)

The warehouse, shops, garage and laundry occupy four separate buildings surrounding a spacious paved court.

HICKS DAIRY

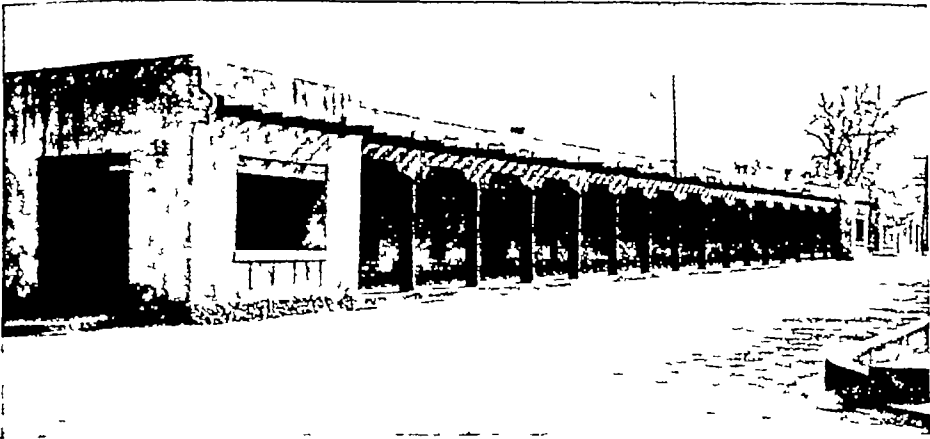
One grade of Milk—"THE BEST" Pasteurized and Raw. All Milk sold by us is produced at our own dairy. We do not buy milk or cream. We have

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The shops are prepared to care for carpentry, plumbing, electrical work, painting and furniture repairs. The shop building houses the water softener which treats all water from a 100,000 gallon main supply tank before it enters the station water mains. All automobile equipment of the station including trucks for transportation and maintenance, ambulance and a Howe pumper fire truck, are housed in this building. Although the buildings are fireproof throughout, special attention has been given to the fire protection. Twelve fire plugs have been placed throughout the station. There is an adequate fire alarm system and employees otherwise regularly employed make up the station fire department. The laundry is adequate and modern in equipment. A giant power plant is perfectly equipped for producing steam heat for all buildings as well as the water heaters. The power plant also houses the incinerator used to destroy all garbage and refuse of the station. Electric energy for the station is purchased from the local utility.

It can be seen from the above description of the physical plant and equipment of this institution that it is entirely modern and that its staff may well be proud of the convenience with which they work and the class of the work which is turned out by them. The staff itself consists of ten full time medical men, one dentist and technicians in the various departments, all graduate and registered nurses and two dietitians.



Old Palace of the Governors Santa Fe, N M

Santa Fe—the Unique Capital City

The most romantic thing about Santa Fe and New Mexico is their early history. In 1528 the expedition of Narvaez came to grief in the waters off the southwestern part of what is now the United States, only four souls being left to tell the story—Cabeza de Vaca, Esteban the Moor, and two others, who had a vague notion that if they traveled far enough westward they might fall in with some Spaniards from the settlement of Panuco on the east coast of Mexico. They missed Panuco and wound up on the west coast near the present city of Culiacan. During their seven weary years of wandering across the continent, they had been told by the Indians of a land of fabulous wealth to the northward—the Seven Cities of Cibola, the Gran Quivira, etc., and of course there was nothing lost in the retelling of these stories to their Spanish friends.

In 1539, Fray Marcos de Niza, accompanied by Esteban the Moor, came up through Sonora and Arizona to reconnoiter the Seven Cities, but the Indians slew Esteban, and Fray Marcos turned back. Next year, Coronado organized a military expedition to complete the work. He came up by the same route, crossed over into what is now New Mexico, engaged the Indians in battle and subdued them. They are now known as the Zuñis. Coronado sent exploring expeditions into the surrounding regions, one of which dis-

covered the Grand Canyon, while another, forging its way eastward, discovered the Sky City of Acoma at the point where it is today, and continuing eastward, found a group of Indian settlements a little distance west of the present town of Bernalillo. Farther to the northeast, they found Cicuye, now called Pecos, on the bank of the river of the same name. There Coronado spent the winter of 1540-41.

The following year, guided by a captive Indian from the lower Mississippi country, called the Turk, they set out to find the Gran Quivira. The Turk led them astray into central Texas but they discovered his perfidy and taking a new guide they made their way into what is now southern Kansas, where they found—not a city of gold and precious stones, but a group of humble tepees! Discouraged beyond measure, the expedition returned to Pecos and Puaray, where Coronado, sick at heart and sorely wounded by a fall from his horse, resolved to abandon the search for treasure and return to Old Mexico.

Thus it was that the region of the upper Rio Grande became pretty well known to the Spaniards by the middle of the 16th century, but it was not until near half a hundred years later that any serious attempt at colonization was made. In 1598, Don Juan de Oñate, at his own expense, fitted out a caravan of colonists, who made their way up the Rio Grande to a

point some 30 miles north of where Santa Fe now stands. There he spent the winter with the Indians of Oh-Keh, now the San Juan Pueblo, meantime founding just across the river a settlement which he named San Gabriel. About a decade later the Oñate family lost favor with the Viceroy of Mexico, who ordered Miguel de Peñalta to take over the command of the colony and to move it farther south. This was done and at some time not earlier than 1610 nor later than early 1614, the whole settlement was transferred to the spot where Santa Fe now stands. This marks the founding of the Ancient Capital and presumably it was at that time that the Old Palace of the Governors was built, or at least begun.

For nearly three quarters of a century the Spaniards and the Indians of the surrounding region got on fairly well, but in 1680 the Indians of the Rio Grande Basin rose in rebellion, slew all the Spaniards they could lay hands upon and drove the rest out of the country, and kept them out for a dozen years. By late 1693, the new Governor and Captain-General, Don Diego de Vargas, made good the reconquest and reoccupation of the province and turned the Government of "La Villa de Santa Fe" back into the hands of the civil authorities.

The history of the next 125 years must be read in some of the many authentic books on the subject. In 1821 came the fall of Spanish sovereignty, New Mexico going of course with Mexico. The Yankee trade had been knocking loudly at the doors of the ancient city for many years, but the Spaniards had preferred a splendid isolation. But with the change in sovereignty came a more liberal policy. The bars were let down and soon the white-winged eagles were crossing the plains by a trail already well established by trappers and adventurers, and which now began to be known as The Santa Fe Trail and which is known to this day as such. By the middle of the century the number of covered wagons crossing the plains annually numbered well up in the thousands, the traffic continuing and increasing until 1880, when the railway

penetrated the region and the wagon traffic died down as suddenly as it had sprung up six decades before.

In the troublous years of the early 60's, the din of internecine strife was heard just outside the city's gates. In fact, the Stars and Bars flew over the Old Palace for a couple of weeks. But the disturbance was of short duration, the region being too far removed from the real scene of conflict.

With the coming of the railroad, which by-passed the city, she suffered a sort of depression, which lasted until well along into the first decade of the present century. Then it was that her history, archaeology, ethnology and climate began to be appreciated more generally, with the result that the economic pendulum swung the other way. The attractiveness of Santa Fe as a residential and vacationing region is now well recognized by discriminating travelers. The climate is particularly alluring. Her altitude of seven thousand feet, with a mile more in the tall peaks in her back-yard, keeps the summer temperatures down to the comfortable point, while the city's southern exposure and the high-lying ground to northward, keep the winter temperatures from excessive or prolonged cold. The highest summer recording for many years past was 92, and while occasionally winter rings the zero bell, the average is around 29 above.

Added to all this is the fact that in north-central New Mexico there are about half a hundred streams and lakes affording trout fishing in season, while the forests yield deer, bear, and turkey.

One of the most distinctive features of Santa Fe is her general architectural set-up. In Spanish and Mexican times, very little material other than adobe brick was used. With the coming of the railway and an influx of Anglos, a different type of structure came into vogue, the newcomers not seeming to care much for what had formerly prevailed. However, the old type has come back into its own, so that nowadays practically all construction is along

(Continued to page 46)



St. Vincent Sanatorium

SANTA FE, NEW MEXICO

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St Vincent has been continuously engaged, with steady growth and improvement of equipment, in serving suffering mankind, to which purpose the Sisters have dedicated their lives.



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Greetings from Santa Fe

The City of Even Climate

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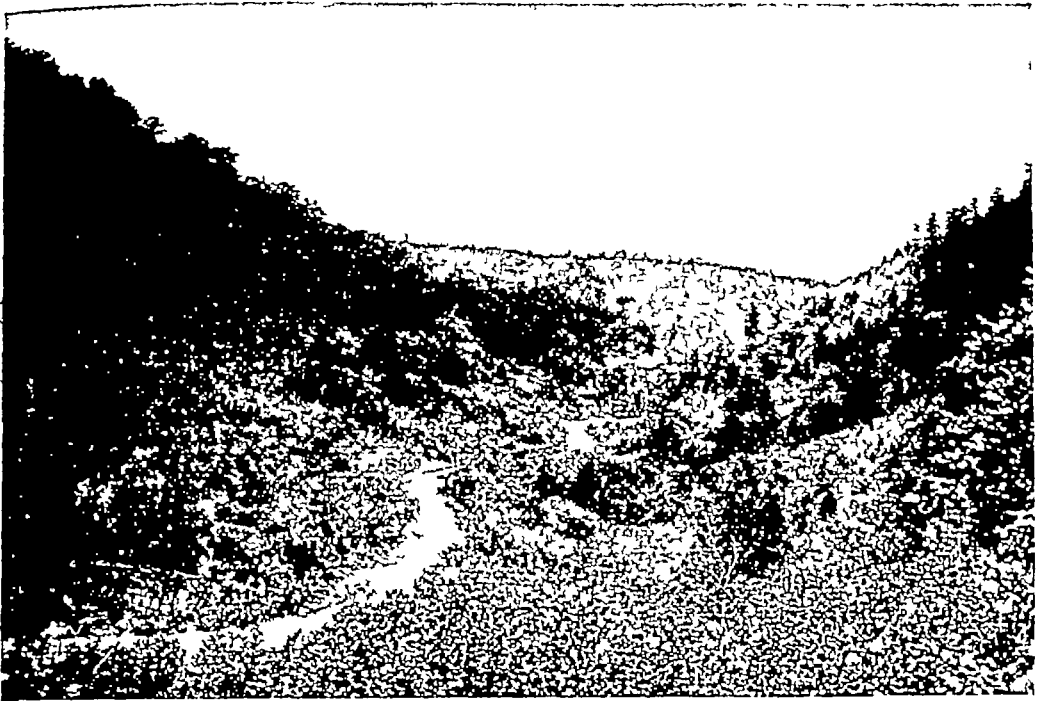
SANTA FE—THE UNIQUE CAPITAL CITY

(Continued from page 44)

the lines of the new-old style, some of which is strictly Spanish and some a composite of Spanish and Indian. One of the finest examples of the former is the Old Palace of the Governors. This structure housed the Government and Governors of New Mexico for three hundred years. Today it is the home of the Museum of New Mexico and the School of American Research. Another fine example is the Laboratory of Anthropology, gift of John D. Rockefeller, Jr., standing at the southern edge of the city. This is a graduate school

of archaeology, its unsurpassed collections of ancient Indian handicraft being for purposes of study and laboratory work rather than for museum display.

Santa Fe hasn't much in the way of "industries," in the sense in which this term is generally used, and with the exception of the small farms along the streams in the northern part of the county, her agriculture is practically negligible. But her tourist traffic and the State Capital and Federal Government office payrolls help to keep her on the map.



A Scene on the Gallinas River near Las Vegas

Las Vegas—on the Santa Fe Trail

La Vega meaning in Spanish "the meadow," or pasture, was the spot looked forward to by the wagon-trains trekking across the old Santa Fe trail, during the days of the gold rush. At a Vega they would tarry for days or even weeks in order to water and re-condition their stock for the next stage of the journey.

At the edge of the mountains where the Mora, Sapillo, Pecos and Gallinas rivers start to spread over the plains was to be found many vegas or pastures, hence the name of Las Vegas meaning literally "The Meadows." Here on the old Santa Fe trail the wagon-trains in their journey from Fort Leavenworth or Dodge City to the Pacific Coast would tarry and rest man and beast. The climate was delightful in summer or winter. During the sultry days of July and August the meadows where the mountains meet the plains, were delightful. In the winter months, the mountains on the west and north broke the shivering wintry blasts and heavy falls of snow. Hence the name of the old camp

grounds grew into the modern city of Las Vegas, appropriately named.

Fifty years ago, that eminent historian, Bancroft, in his history of New Mexico, made this statement: "In climate and scenery this region is unsurpassed by any in the territory and is perhaps the most agreeable of all New Mexico towns as a place of residence." What that learned scholar said fifty years ago is equally true or more so today. With an elevation of 6380 feet and a mean annual temperature of 67 degrees and seldom if ever a day when the thermometer goes above 90 and winters when sub-zero temperatures are the exception, with sunshine every day and fog an unknown quantity, what could be more ideal, healthful, and agreeable to either the well-and-healthy or the convalescent or health-seeker?

Here at "the meadows" is to be found men and women who came to "the meadows" twenty-five and thirty years ago, given but a few months or a year to live, and who today are living testimonials

to what Bancroft said Here, also, Dr John B Murphy of Chicago, the famous surgeon and father of artificial pneumothorax therapy, recovered his health

Years before many present-day New Mexico cities were founded, Las Vegas had already set up modern hospital facilities for the care of the tubercular The Sisters of Charity early established St Anthony's Hospital and Sanatorium The institution was for years the guide post for the establishment of other similar sanatoria in New Mexico and the entire Southwest Following shortly after the Sisters came other pioneers in the development of sanatorium facilities in New Mexico Dr Frank Billings, Dr E Fletcher Ingles, and Dr Arthur Corwin founded the Valmora Sanatorium, one of the oldest private sanatoria in the State of New Mexico Today Valmora Sanatorium at Valmora, about twenty miles from Las Vegas, stands as a monument to their efforts and those of Dr W T Brown Dr Brown with advancing years and increasing outside interests, has turned over the active management to Dr C H Gellenthien, one of his former patients, who found health at Valmora and who is now one of the recognized specialists in the Southwest in the treatment of diseases of the chest and lungs

Not only are cool, fogless, sunny days and actually chilly summer nights a delight and a God-send to the tubercular, seeking restoration of health, but to the vacationist as well "One of the newer and one of the most important of our social institutions, the ideal vacation," as well said by a nationally known social worker, "can be spent in no more enjoyable, delightful, historical and healthful spot than the Las Vegas area of northeastern New Mexico Fishing, hunting, mountain climbing, horseback riding and, believe it or not, surf board riding, are all available to complete a full vacation "

From the famed El Porvenir hotel on the Gallinas River, high up in the mountains, open all year around, to the simpler, yet clean and attractive cabins and "dude

ranches," one may find just the type of place at just the price he wants to pay Visitors find Las Vegas the ideal center for scenic side and round trip excursions of a day or two, or pack trips into the higher mountain regions of a week or more as desired Two of the most popular round trips out of the meadow city is to the ancient Indian Village and artist center of Taos By one route, the Cimmaron river valley, Eagle Nest Lake and Raton are visited with a side stop at old Fort Union, the one time U S Army Headquarters for the Southwest during the Indian wars The other route takes in the ancient capital city of Santa Fe, the Indian pueblos of Teseque and Pajauque Both routes are good with new hard-surfaced or paved roads both going and returning By either route, Mora, one of the few remaining typical Spanish county-seat towns, thirty miles off the railroad, will be seen, and then the Tres Ritos country on the top of the range and probably the best known trout fishing area in the entire state

Las Vegas has a delightful, dry climate Las Vegas has cool days and cooler nights throughout the hottest months Las Vegas has one of the purest and best municipal water systems in the entire West, adequate for a population of 50,000 while our city only numbers ten thousand, the supply drawn from the Gallinas River and adjacent springs and called Agua Pura, meaning in Spanish "Pure Water " Las Vegas has and has always had one of the best educational systems, both public and private in New Mexico or anywhere in the Southwest The now discontinued Jesuit College in Las Vegas was the first institution of higher learning in the entire West and Southwest and includes among its alumni such well-known citizens as the Ilfeld brothers, Herman C now deceased, his two surviving brothers Arthur C and Louis C, Hon Luis E Armijo, present judge of the fourth judicial district and many other men prominent in public life who have grown to manhood in New Mexico and educated in Las Vegas Keeping step with advancing educational require-

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20 Miles East

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Roomy, Comfortable Cottages with
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Superintendent

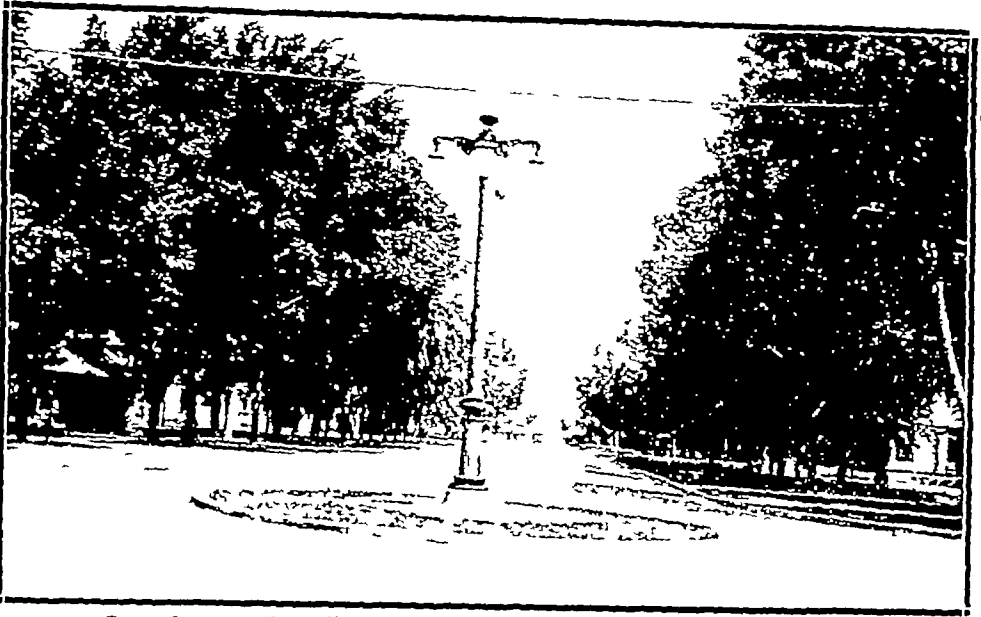
C H GELLENTHIEN, M D
Medical Director

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ments, the city has never allowed its reputation as an educational center to lag. With the New Mexico Normal University, the state's recognized Teachers College heading the list, followed by two high schools and six more intermediary grade schools, the city continues to maintain its high educational standing. Las Vegas has all the religious, fraternal, social, professional and service organizations, generally found only in cities twice as large. Las

Vegas has what is conceded to be one of the fastest golf courses in the Southwest and golfers who know how to play it. Las Vegas has streets paved and graveled throughout, with plenty of old stately shade trees bordering them behind which nestle some of the state's finest homes.

Las Vegas has everything you want or could want. We want you and your friends, particularly if seeking recreational, vacational or convalescent facilities, to come to the Meadow City.



Every Street in Roswell shows an abundance of Trees, Shrubs and Flowers

Roswell, New Mexico

Roswell offers to the healthseeker, visitor and settler an abundance of sunshine, low humidity, invigorating temperatures and a general equability of climate.

Roswell is abundantly blessed with thousands of large shade trees, green grass, shrubbery and flowers. Nowhere will you find a more beautiful city.

There are by actual count more than thirty thousand trees in Roswell, ranging all the way from the large massive beautiful cottonwood and elm, forty years old, down to those which were planted last spring. Roswell believes in trees, and plants hundreds of them each year. They thrive and grow rapidly. And along with the trees are the beautiful homes, lawns, parkings and flower gardens.

Roswell has 12,000 people, ninety-five per cent of whom are white American. A very large per cent of them have come at one time or another because of the climate—hundreds of them sent by doctors to get well, and they did, others coming before it was necessary to be sent. Bankers, lawyers, doctors, preachers, merchants, farmers and laboring men—carrying on their normal lives with no thought now of those days years ago when they were sent to regain their health.

They, for the most part, were the type who were willing to make the fight and win—and naturally they love the place that gave them back their health. And they have stayed to help build and build well a community which prides itself on good schools, active churches, beautiful public buildings, paved streets and all other modern conveniences, modern up-to-the-minute business institutions, serving a territory seventy-five miles in each direction. Four million pounds of wool are shipped from Roswell annually, thousands of lambs and cattle, and additional hundreds of car loads of farm products. Because in the county are fifty thousand acres of irrigated farms, watered by the same water which grows trees and flowers and grass in Roswell. Alfalfa, cotton, corn, vegetables, and apples are the chief farm products of the county.

There's another feature about the water that is of particular interest to health seekers. The water supply comes from artesian wells, 300 feet deep in the Roswell area. The water is rich in the soluble sulphate of calcium. The water also contains a small quantity of sulphate of magnesium and sodium sulphate which is beneficial in many gastro-intestinal con-

ditions The water is pure and clear at all times and the supply is plentiful There is never any limit to the use of water by the city or its inhabitants

Roswell winters are extremely mild While the mercury usually goes below freezing each night in winter, the days as a rule are bright, warm and pleasant In summer the sun is hot but because of the low humidity the heat is not unpleasant and the night following the hottest day is cool and pleasant for sleeping

The percentage of sunshine in winter is as great as in summer The annual rainfall at Roswell is 14.7 inches, three-fourths of this coming between May and October when it is most desirable The winters are dry

The wind movement at Roswell is remarkably low, being less than any place east of the Rockies recorded by the United States Weather Bureau

Roswell is noted for its excellent school system With a complete senior high school, junior high school and six ward buildings the equipment is modern and complete Only experienced teachers with college or University training are employed Physical education, domestic science, manual training, music, and art are included in the curriculum and the schools have one of the finest bands and orchestras in the Southwest

This is also the home of the New Mexico

Military Institute, a state school under government supervision, accommodating 450 boys from all over the United States The curriculum includes high school and junior college work It is a cavalry school and every boy rides Here again climate plays a big factor While every boy must pass a rigid physical examination to be admitted, yet the factor that the boys may be out in the open practically every day during the school year, adds materially to the physical development during the nine months

Because Roswell is in essentially an outdoor climate, there has been much development of outdoor recreational facilities There are adequate parks and play grounds scattered throughout the city The city maintains seven concrete tennis courts for the enjoyment of the public The eighteen hole golf course at the Roswell country club is open for the use of the public on payment of a nominal greens fee The Bottomless Lakes State Park, twelve miles east of Roswell, offers ideal swimming, picnic grounds, hiking and scenic attractions In the Lincoln National Forest sixty miles west of Roswell are 1,500,000 acres of timber, mountains, trout streams, and miles and miles of scenic drives

Roswell is an ideal place to get well It is a delightful place to spend a vacation It is a better place to live

ROSWELL, New Mexico

The right place for your patient

Altitude 3600 feet

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Raton—the Gateway into New Mexico

BY

R H FAXON

Secretary Manager Chamber of Commerce, Raton, New Mexico

Raton is the Gateway, the Open Door, into New Mexico

Its hail and farewell have greeted thousands upon thousands of visitors to the Sunshine State, and it glories in its responsibility

Located in the northeast corner of the state, not far from the Texas line, almost literally upon the Colorado line, its situation is peculiar, pleasant, obligatory

On the main line of the Atchison, Topeka & Santa Fe Railroad, on three great Federal highways, it is, indeed, a Main Street over which marches a host of strangers to find welcome in a strange land

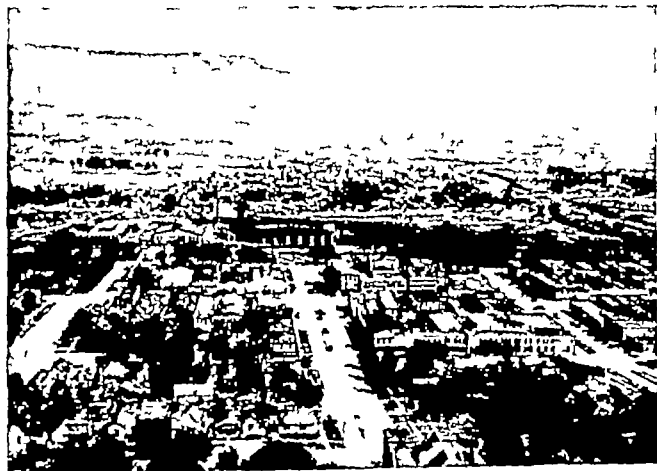
Cultivating to the utmost its spirit of hospitality and deep concern for the welfare of the visitor, it feels that it is best serving its great state and the public by this more or less single quality—keeping the gate, the door, open for friendly welcome to incomers, a kindly goodbye to outgoers

Raton is not a "tourist city," in the best sense of the word in the Western vernacular But it does stand as sentinel at the gateway

to one of the finest regions of the state, and, indeed, to the state as a whole

But Raton is not without its interesting qualities, by any means

At its door is Capulin Mountain National Monument, one of the eight National Monuments of the state Capulin Mountain is the most perfect extinct volcano on the North American continent Its elevation is approximately 9,000 feet It is on U S Highway 64 and immediately adjacent to U S Highway 87, 35 miles east of Raton It is reached by these admirable roadways, and over them thousands upon thousands of visitors go to view this wonderful scene Winding up to its top is a government-constructed roadway, 6 per cent, safe, wide, a beautiful drive At the top is ample car-parking space, and then the visitor goes down a winding pathway to the bottom of the crater, a distance of some 500 feet, there to view the cauldron where, thousands of years ago, was mixed the molten mass that spewed from the rim of the bowl and wound its way undulatingly down the side and over the valley—a ribbon-like tracing that the eye can follow in all direc-



Raton—the Gateway into New Mexico

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When You're in New Mexico
You Can Always Get
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ACCURATE PRESCRIPTION SERVICE AT ALL TIMES

Complete Line of Drugs

LAMBERT'S DRUG STORE

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The Rexall Store

Here is Your REXALL Store
ANYTHING YOU WANT IN DRUGS
NUTTING'S DRUG STORE — Raton, N M

tions From the top of this splendid mountain, on a clear day—and practically every day is a clear day in New Mexico—one may view five states—New Mexico, Texas, Oklahoma, Kansas, and Colorado The mountain is symmetrical, beautifully perfect, and its name, Capulin, means, in Spanish, "cherry," given in the not always fanciful way by Spanish, Mexican, and Indian, to mountains and rivers and towns and plains by the early explorers, because of its resemblance to the cherry, with the slight dip at the top, discernible from considerable distances, not unlike the base of the cherry where the stem attaches

Raton is also noted for its magnificent Raton Pass, at an elevation of 8,500 feet, where, from Trinidad on the Colorado line, the road ascends gradually, in beautiful curving, to the state line, thence upward, with panoramic view of mesas, valleys, wonderful verdure and tree and plant life, the Sangre de Cristo range to the westward with its eternal snowclad peaks Shortly the town of Raton, nestling in the valley, at an altitude of something less than 7,000 feet, bursts upon view This Scenic Drive over Raton Pass is one of the really grand and impressive things about the entire Western country

Down in the valley, now climbing to the heights above, curving around as does the Scenic Drive itself, and at the top passing through a long tunnel, is the main line of the Atchison, Topeka & Santa Fe Railroad, that pathway from Chicago to the West Coast that is one of the great iron highways of the country

Now along the line of the railroad, now along the line of the Scenic Drive itself, is the Old Santa Fe Trail, that, from Columbia, Missouri, then Independence, then Westport Landing, now Kansas City, Mo, through Kansas, across the corner of Colorado, and into New Mexico over "The Pass," carried the hardy pioneers from 1821 onward The Old Santa Fe Trail, through what is now Raton, southward, through Cimarron and "The Gap" immediately south, through Springer and Wagonmound, two lines, ran into Las Vegas, and thence to Santa Fe, "The End of the Trail," winding up at La Fonda and the Plaza and El Palacio—the Palace of the Governors La Fonda is now converted into the beautiful Fred Harvey hotel, one of the famous hostleries of all the West

So Raton is rich with its history Its Wootton tollhouse, still standing, now a ranch headquarters, its old Willow Springs Ranch right in the city of Raton, its old Clifton House immediately south of the city, where the travelers used to rest and seek

protection in the wagon-trek, embellish and enrich the country with memories and with now partly-spoliated places which may be reconstructed in the not-far-distant future to remain as monuments to the brave pioneers Old Fort Union, on the southward, is another place where safety was sought and refuge taken in those days, and that, too, is a reconstruction possibility

Now, over the old route of the Santa Fe Trail, the route of the present Santa Fe Railroad, the route of the Scenic Drive, with aeroplanes darting overhead, the whizzing motorist goes over famous U S Highways 85 and 87 It is an epic in Transportation!

Raton is a city of somewhat under 7,000 population It is sightly, clean, bright, winsome, attractive Its shops, its fine hotels, its beautiful homes, attest the best in modern life

Its principal industry is the coal-mining enterprise, with its great Saint Louis & Rocky Mountain Company, with its eight camps and its vast output of necessary fuel

Its industry of almost equal value is that of livestock. Cattle on the hills, in the valleys, on the slopes, attain a quality sought by Eastern markets, and of a breed that has made the country famous Its sheep are of the finest Its horses have brought renown to the region Its Stock Shows, its Fairs, its Polo Games and Rodeos are among the classics of the Western country

Withal is a market region in jobbing and distribution that give sustenance in goods and services that have made of Raton a veritable Market Centre

All the comforts, all the pleasure, all the culture of fine modern life are afforded in this town of Raton, Gateway, Open Door, into New Mexico

Daily the hundreds of travelers pass through Some tarry for a length of time Some pause for refreshment, for necessities, and for information regarding the gay pleasure spots further along, in Cimarron Canyon, at Marvelous Eagle Nest and superb Red River, at quaint Taos, or at Springer and Wagonmound and old Las Vegas, and thence into Santa Fe, eldest city of the American continent, Albuquerque, metropolis of the state, Gallup, the Indian capital, Socorro, Hot Springs, Carlsbad, Clovis, Roswell—and all the other wonder-spots of a wonder-state

But Raton bids them enter, bids them goodbye, as you who travel restlessly and pleasantly, fast or slow, will see, inevitably, for, soon or late, you must pass through Raton and over its Pass or eastward through the lovely valley into states in that direction

Raton Gateway!

Story of Las Cruces

LAS CRUCES, NEW MEXICO, founded in the early 19th century, is the commercial center of the fertile Mesilla valley. The City received its name from an incident quite typical of the rough days of the early pioneers.

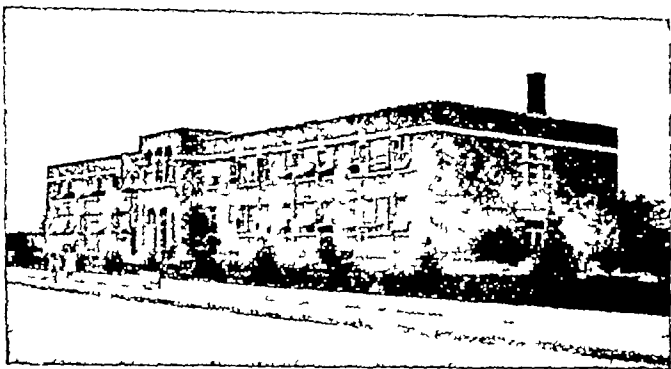
A caravan of carts, drawn by oxen and heavily laden with freight from Santa Fe to Chihuahua, was attacked by Indians at the point where Las Cruces now stands, and was entirely destroyed. A few days later a party from Dona Ana buried the bodies and erected crosses over the graves. From that time on the locality was known as "The Crosses," or, in the Spanish tongue, Las Cruces. The exact location was on the old Santa Fe-Chihuahua Trail.

Present day Las Cruces is a prosperous little city of about 7,500 population. It is the county seat of Dona Ana county, the home of the New Mexico State A & M College, the center of a rich agricultural district which in 1928 totalled more than \$13,000,000 worth of products. It possesses fine schools and churches, two banks, a public library, farm bureau, many civic and social clubs, hotels and tourist camps, a beautiful country club building and sodded golf course, a build-

ing and loan association, an active chamber of commerce—all the adjuncts of modern community life.

The climate of Las Cruces is especially beneficial for those suffering from any form of tuberculosis, asthma, or catarrh.

Modern Las Cruces still merits its name "The Crosses," altho for a pleasant and not a tragic reason. It now stands at the crossroads of two great national highways, U S 80 and U S 85, and thru its streets pass daily many hundreds of tourists' cars as they cross from north to south, east to west, the famous trails that bind together the immensity of these United States.



The Beautiful New Union High School at Las Cruces

Welcome! TO LAS CRUCES, NEW MEXICO

A Haven for Tourists and Health Seekers

You Will be Interested in the Climatic
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Deming, New Mexico— The City Beautiful

Deming, too, has an historical background, rich in incidents of tradition and romance, such features are however of much more interest when personally searched out. It is situated on the mesa comprising the eastern brow of the continental divide at an elevation slightly above 4,300 feet, thus assuring a climate with neither excessively high nor low temperatures, and is blessed with a quality of water that requires no treatment before being used for any purpose, and in sufficient quantity to be used for irrigation of certain areas when brought to the surface by pumping.

The principal industries of southwestern New Mexico are cattle and sheep raising, agriculture, and mining. Deming lies at the gateway of the Gila National

Forest, the largest wilderness area in the United States, consequently a vast scenic region for recreational, hunting, and fishing activities. Certain sections of this mountainous region are rich in mineral deposits where may be found the traditional prospector and actual miner, lured on by this ever enticing goddess.

Deming has all the conveniences deemed essential for modern civilization, yet, it has more an atmosphere that impregnates with healing and freedom.

The Holy Cross Sanatorium, the largest in New Mexico, equipped with every modern facility for the treatment of pulmonary ailments and surrounded with the most favorable natural elements—abundant sunshine, pure air, and water—is a real boon to mankind. STOP at DEMING.

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PRESCRIPTION SPECIALIST
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PALACE DRUG STORE

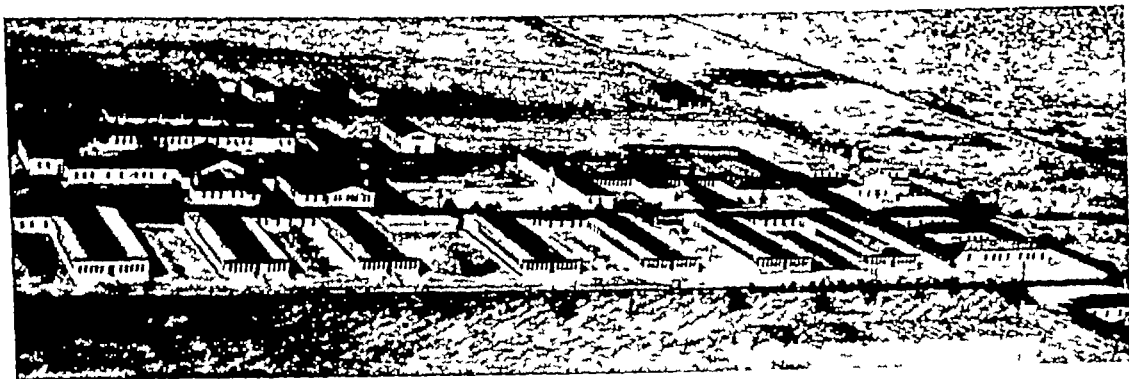
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The Drug Store You Can Patronize With Confidence
DEMING, N. M.

J. A. Mahoney, Inc.

AMBULANCE SERVICE

Established in 1882

DEMING, NEW MEXICO.



Aerial View of Holy Cross Sanatorium, Near Deming, New Mexico

An Oasis in the Desert

BY

SISTER M PIUS

*Holy Cross Sanatorium
Near Deming, N M*

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10th, at its Convention Headquarters
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presence and counsel

● THE FEDERATION OF AMERICAN SANATORIA has learned that one-hundred British physicians are making a tour of the United States on their way to Australia, and that they will be in Albuquerque on August 10th. The Federation is making preparations to extend a welcoming hand to its colleagues from across the sea.

● In this connection, we desire to add that our English physicians have co-operated with us in our editorial policies of DISEASES OF THE CHEST, The Federation's official monthly organ. So far, two splendid articles written by English doctors have already appeared in the columns of DISEASES OF THE CHEST. Many British doctors have written the Federation commendatory letters anent the Organization and its official publication.

●
LE ROY S. PETERS, M.D.
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DISEASES *of the* CHEST

Published Monthly by the Federation of American Sanatoria

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RAINFALL (in inches— 40-year average)	8.96	8.1	3.2	1.4	2.3	2.4	2.6	1.0	6.76	10.9	11.57	8.1
HUMIDITY (Monthly— 40-year a. average)	61	55.6	44.8	40.4	28.4	29.3	34.3	51.3	47.1	46.8	57.1	74.2
	35.3	27.7	22.4	22.6	15.9	17.7	36.7	35.7	29.0	26.5	41.1	48.1
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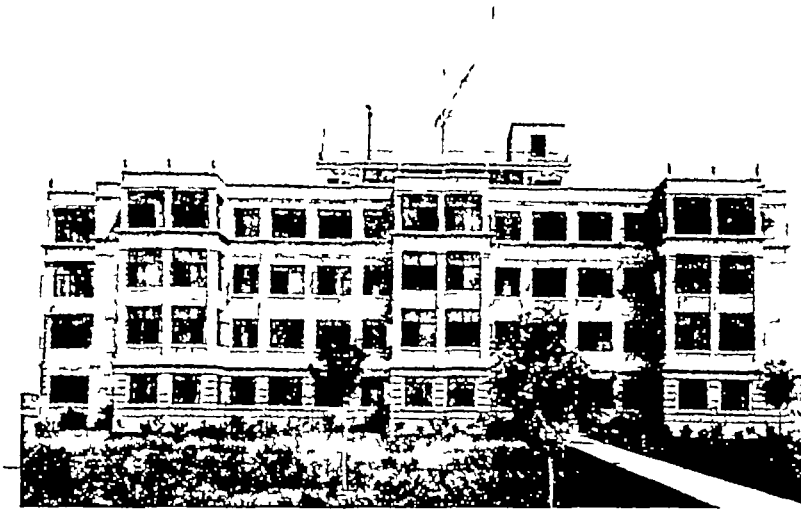
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CHEST

C. M. HENDRICKS EDITOR IN CHIEF

(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"
Lawrason Brown, M D

Editorial Comment

Convention TUBERCULOSIS is a disease
Federation that can only be managed
of American adequately by hospitaliza-
Sanatoria tion, at least until stabili-
zation is obtained

Modern treatment has successfully invaded the field of far advanced tuberculosis, an invasion that calls for intensive treatment of the disease. This intensive treatment is available early in the workshop, namely, the tuberculosis sanatorium.

State Medicine has come very close to the management of tuberculosis in the United States. Municipal, County, State and Federal hospitalization of this disease has attained such proportion that it must be recognized that State Medicine has arrived so far as tuberculosis is concerned.

There are proper invasions of the State into the Tuberculosis problem because it is a major transmittible disease. Proper hospitalization for the indigent of the Community or State should be made available by the Community or State, not only that the individual may be treated and his health-menacing environment destroyed, but his isolation is a necessity while he is an open case.

But State Medicine can go too far in invading the hospitalization of this disease. Not only because the State should not enter into competition with the private practice of medicine, but obviously State hospitalization can never bring to the patient the complete service that the private hospital or sanatorium can.

Whether Fascist Italy, Communist Russia or in our own free land, State service must always be "the greatest good for the greatest number." State hospitalization of tuberculosis is the greatest good for the greatest number. Individual study of the case, choice of the therapeutic agent applicable for the individual case, and the execution of this selective treatment cannot be carried out in the State institutions.

Intensive and elective treatment for the individual case is the modern sphere for the private sanatorium in the management of tuberculosis. Never before has there been such a demand for elective treatment of individual cases as the present, when pneumothorax and surgery have made such inroads into the adequate management of far advanced stages of this disease.

It should be borne in mind that the surgical procedure in pulmonary tuberculosis removes no pathology but is only the preliminary step of a long-drawn-out period of one to six years of intensive treatment and convalescence to the end that the more advanced stages of this disease can be satisfactorily fibrosed.

The above is an outline of discussion of the Executive Council meeting of the FEDERATION OF AMERICAN SANATORIA held at the Franciscan Hotel in Albuquerque, New Mexico, on August 9, 1935. The representatives of private sanatoriums treating tuberculosis in the United States and physicians limiting their work to the specialty

of tuberculosis had assembled for the first annual meeting of the above-named organization Dr LeRoy Peters of Albuquerque, New Mexico, presided, and contributing to the discussion were Dr Frank Porter Miller of Monrovia, California, Dr Louis Mark of Columbus, Ohio, Dr C M Hendricks of El Paso, Texas, Dr F M Pottenger of Monrovia, California, Dr R B Homan, Jr, of El Paso, Texas, Dr Max Rothschild of San Francisco, California, and Dr Orville Egbert of El Paso, Texas.

The first Convention Meeting of the FEDERATION OF AMERICAN SANATORIA was called to order by Dr LeRoy Peters of Albuquerque, at 10 00 a m, August 10, 1935, in the Franciscan Hotel in Albuquerque. Dr Peters appointed the following committees

Constitution and By Laws

Dr O E Egbert, El Paso, Texas, Chairman
Dr C O Hook, Ft Worth, Texas
Dr Frank P Miller, Monrovia, California
Dr William H Thearle, Albuquerque, N M
Mr Hugh P Cooper, Albuquerque, N M

Legislative Committee

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Dr C M Hendricks, El Paso, Texas
Dr J E J Harris, Albuquerque, N M
Dr J J Barfield, Colorado Springs, Colo
Dr M A Cunningham, Deming, N M
Dr Frank Mera, Santa Fe, N M

Ways and Means

Dr Max Rothschild, San Francisco, Calif, Ch
Dr Sam F Watson, Tucson, Arizona
Dr LeRoy Peters, Albuquerque, N M
Dr R M Shepard, Tulsa, Okla
Dr H C Goodsen, Colorado Springs, Colo

Committee on Resolutions

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Mr Karl Barfield, Tucson, Arizona
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Dr J L Anderson, San Antonio, Texas
Dr I B Ballenger, Albuquerque, N M
Dr C H Gellenthien, Valmora, N M
Sister Henrietta Marie, Albuquerque, N M
Sister Mary Pius, Deming, N M

Nominating Committee

Dr R B Homan, Jr, El Paso, Texas, Chairman
Dr A Minnig, Denver, Colo
Dr V L Mahoney, Tucson, Arizona
Dr Carl Mulky, Albuquerque, N M

The Convention was called to order again in the afternoon at 2 00 p m by Dr C M Hendricks, Dr Frank Porter Miller serving as temporary secretary. Report of committees was called for. In each instance these reports brought out sparkling and valuable discussion. All committee reports were adopted. It was decided to publish the proceedings of this first annual convention in full.

Kansas City was chosen for the next convention, and the date was set for June 6th, 1936. The following officers were elected

President—Dr William Devitt, Allenwood, Pa

Vice-President, Pacific District—Dr Ralph Matson, Portland, Oregon

Vice-President, Southwestern District—Dr Sam H Watson, Tucson, Arizona

Vice-President, Central District—Dr Louis Mark, Columbus, Ohio

Vice-President, Southern District—Dr Chas Cocke, Asheville, N C

Vice-President, Atlantic District—Dr Geo F Heiben, Loomis New York

Secretary-Treasurer—Dr R B Homan, Jr, El Paso, Texas

Editorial Board—

1 Dr Arnold Minnig, Denver, Colorado, 3 years

2 Dr C M Hendricks, El Paso, Texas, 2 years

3 Dr Champneys H Holmes, Atlanta, Ga, 1 year

The honor guest of the Convention was Sir Henry Gauvain of London, England, who addressed the assembled delegates at 2 00 p m. He talked on the social and economic problem of tuberculosis in the United Kingdom.

The Federation Meeting was closed with a banquet at 8 00 p m, with Dr W A Gekler of Albuquerque as Toastmaster. The principal addresses of the evening were delivered by Dr F M Pottenger of Monrovia and Dr Louis Marks of Columbus, Ohio.

Friends of DISEASES OF THE CHEST, we trust, will be happy to know that the Federation in its first meeting was as enthusiastic about the success of this journal in

its first year of existence and were unanimous in their desire to perpetuate it, and made plans for its editorial and economic existence that will insure its readers of another year that promises to be bigger and better than the first O E E

Some Fallacies in the Treatment of Pulmonary Tuberculosis

UNFORTUNATELY there has not yet been found a remedy, either medicinal or otherwise, which has met the requirements of a specific in the treatment of tuberculosis of the lungs. It is true that there are now in use a number of remedial measures each of which is helpful in its way, and if these are used judiciously, either singly or in combination as may be indicated in the individual case, many tuberculous persons may be enabled to overcome the disease and become completely rehabilitated.

Of these remedies there can be no question that rest is the one of prime importance. Having this knowledge it is not difficult to imagine our surprise when we were called recently to see a young man about nineteen years of age who, together with his parents, had come to the Southwest because he had tuberculosis and who had been instructed by his home physician that it was not necessary to consult a physician when he reached his destination, but to walk five miles every day, adding that some days he would not feel equal to doing it but to go any way. The young man had religiously followed these instructions until the morning on which we were called when he fell from exhaustion before completing the five miles. It is not difficult to surmise what the result of such treatment would be.

In no other disease has there been such imposition in the way of treatment as there has been in tuberculosis. Almost everything has been suggested and tried from the drinking of warm beef blood, up and down the line. We are too prone to accept methods of treatment as being

meritorious without taking time to reason out the possibilities in the light of the knowledge which we have of tuberculosis, especially concerning its pathology.

One of the fallacies which has come into use in some sections, and which has really had the approval of some physicians, is the inhalation of vaporized oils which are supposed to hold in suspension various medicinal preparations which are designed to destroy the tubercle bacillus.

Such treatment is practically without any value for the following reasons:

1. No chemical agent is known which will destroy the tubercle bacillus by contact, which could be taken into the bronchial tubes or all cells with safety to these tissues. In other words, any medicinal agent which would destroy the tubercle bacillus in situ would seriously damage the lung tissue as well.

2. In the lesions where cavitation has not taken place it is impossible to reach the bacillus by preparations used in this manner.

3. Granting that it is possible to fill a cavity with any kind of vapor or gas by inhalation, (and that is doubtful), and that such a preparation would destroy the bacilli with which it comes in contact, the treatment would still be ineffective inasmuch as the bacilli which are responsible for the destruction of lung tissue and production of toxic poison are for the most part working around and outside of the cavity, and are protected from approach by such gases or vapor by the dense cavity wall.

4. If rest of the lung promotes healing, and we believe it does, then the forced deep inspiration necessary to getting such preparation into the air passages would retard healing.

In the interest of the patient we plead for the use of more serious thought and mature judgment upon the part of physicians in the selection of methods of treatment in tuberculosis. Let's not take up with the fads and fallacies which have no foundation in fact for the virtues claimed for them.

R.B.H.

Sunlight in Tuberculosis

HELIO THERAPY, or the treatment of disease by sunlight, is one of the most ancient therapeutic measures employed by man

BY
A. R. MASTEN, M. D.
*Lutheran Sanatorium
Wheatridge, Colorado*

The ancient Greeks, however, appear to have been the first people to use this method of treatment in a rational manner. The name heliotherapy is derived from two Greek words Helios, meaning the sun, and therapeia, meaning healing power. Hippocrates (460 B. C.), "the Father of Medicine," used sunlight in treating tuberculosis, in fact, he used what appears to be a very modern treatment for this disease, since he recommended that the sufferer be sent away to the hills beyond the city, where he would have plenty of rest, fresh air and sunshine. The Greeks used heliotherapy for many other diseases also, and most of the large Greek houses had solaria or, as they were called, helioses. The great temple dedicated to the Greek God of Medicine, Aesculapius, was situated on the slope of a mountain facing the south and at an altitude of three hundred feet above the sea, thus giving it a maximum amount of fresh air and sunlight for that vicinity. No doubt most of the marvelous cures ascribed to this famous shrine were due in large part to the healthful location in which it was situated and particularly to the healing effects of sunlight. In the Western hemisphere, the Incas of Peru had great faith in the healing powers of the sun and treated many ailments by sunbaths. The use of sunlight for treating diseases has been widely advocated, but in many instances indiscriminate use of this treatment led to failure and, in the end, disrepute of the method. Modern scientific use of heliotherapy for tuberculosis dates largely from 1903, when Rollier began his work with the use of sunlight in surgical tuberculosis at Leysin in the Swiss Alps. Rollier achieved such remarkable success with his method of treatment that he became the outstanding figure in the field

of light therapy and initiated a period of intensive study upon the physiological and therapeutic effects of light, which has

been carried on throughout the world. Today, a great deal is known about the physical nature of sunlight, as well as its beneficial and harmful effects upon the human body. This knowledge has shown that in many diseases sunlight is of great value, while in others it is not only valueless but is frequently harmful. Not only do the results of heliotherapy vary with different diseases, but also with different individuals with the same disease, so that it is very important for every sick person to consult a physician before he takes sunbaths.

Sunlight is composed of waves of different lengths which, when passed through a prism, are broken up into the colors of the rainbow. This rainbow image is called the spectrum of the sun. The portion of the spectrum which is visible to the human eye is only part of the sun's spectrum, however, for there are rays both below and above the section which is seen as the rainbow. The different colors of the rainbow each have a different wave length, with the red the longest and the violet the shortest of the visible rays. Between these two colors are arranged the orange, yellow, green, blue and indigo which pass into each other without sharp boundaries of separation. Physicists measure these light rays in what are called Angstrom units, each unit being equal to one ten-millionth of a millimeter (a millimeter equals 0.03937 of an inch). The waves which appear as red to the human eye have a wave length of 7,000 angstrom units, while the violet rays have a length of 4,000 angstrom units. The wave lengths of light longer than 7,000 angstrom units are called infra-red rays and are largely heat-producing. The wave lengths shorter than 4,000 angstrom units are called ultra-violet rays and it is these which play the

most important part in heliotherapy. These rays also are the main ones which produce chemical action and are sometimes called chemical rays. Their chemical action is quite evident in photography, where the chemical substances in the photographic film are extremely sensitive to the rays of shorter wave lengths and are practically inert when exposed to the long rays. For this reason films can be developed in red light without being affected. In the upper layers of the atmosphere the ultra-violet rays react on the atoms of oxygen and cause them to link together, forming ozone which is highly bactericidal. This action destroys most organic impurities in the air and, at the same time, renders it healthful, in fact, air which has been exposed to strong sunshine produces many of the effects of sunshine itself. At low altitudes there is such a thick layer of atmosphere to be penetrated by the light rays that most of the health-giving ultra-violet rays are consumed before they reach the earth. In the high altitudes, however, the thinner layer of air, as well as the lightness of the air, prevent it holding any great amount of foreign matter, or moisture, etc., and, consequently, the ultra-violet rays reach the earth in much greater numbers than at the lower levels. For example, it has been found that at Denver, Colorado, (altitude one mile) the effects of sunlight are as efficient in the middle of winter as the rays are at Toronto in the strong sunlight of summer. This efficiency of the sun's rays is also affected by latitude, since practically all ultra-violet rays are filtered out if the sunshine strikes the earth at an angle of less than 35 degrees.

Sunlight has been said to be the most important climatic factor in relation to the treatment of tuberculosis. This is particularly true in relation to extra-pulmonary tuberculosis, but applies to a certain extent in all types of tuberculosis. In the pulmonary variety, however, direct exposure of the body to the sun is seldom indicated, since the sun-bathed air contains all the ultra-violet rays that can be tolerated by most patients.

One of the most important effects of sunlight is the mental help given to a patient. Rollier states that the close relationship between sunshine and happiness is so obvious that it requires no emphasis. He says, "Anyone who has seen the splendor of a typical winter's day in the Alps, with its brilliant sunshine and still, cold air, will realize what a stimulating effect it has. The psychological counterpart of this environment is a condition of hope and confidence, which undoubtedly influences the evolution of tuberculosis favorably, and the ultimate issue of a case is to a large extent dependent on the mental condition of the patient, for the struggle with this disease is bound to be a long one and the patient's courage and endurance are constantly called into play."

Besides its action on the mind, sunshine has many definite physiological actions. The exposure to direct sunlight readily effects the destruction of tubercle bacilli, especially in the presence of abundant oxygen. Obviously, this has an important action in keeping the air and soil free from tuberculosis germs in those climates where sunlight is not obstructed by clouds, moisture, extreme depths of atmosphere, smoke, etc. The ultraviolet rays have also a bactericidal effect to a depth of 1.5 mm in the human skin and have a weakening effect on bacteria to the depth of 4 mm. Sunlight also increases the metabolism of the body, producing a marked improvement in general nutrition and an increase of the musculature. Animal experiments also indicate that sunlight increases the bacteria killing power of the blood, probably by improving the functions of the leucocytes. These cells are increased not only in numbers, but show increased powers of phagocytosis. Sunlight also increases the efficiency of the blood by stimulating the production of red blood cells and increasing their haemoglobin content.

In addition, sunlight acts as a general tonic to the whole body. It strengthens the skin, improves the musculature better than the best massage and, at the same time, strengthens the thoracic and abdo-

minal organs so that the internal secretions are increased, digestion becomes regular, weight increases and strength is renewed. In a word, sunshine is the best tonic known.

Another effect of ultra-violet light on the body is the marked accentuation of calcium metabolism. This action is used to prevent and cure the disease, rickets, which is a deficiency disease formerly treated with cod-liver oil. The cod-liver oil and the light probably act in the same way, that is, by supplying vitamin D, the lack of which has long been known to produce rickets.

In recent years, the knowledge that ultra-violet light produced so many apparently beneficial effects has led to its use for all manner of disease, in many of which it has produced more harm than good. Active pulmonary tuberculosis is one of the diseases where it produces much harm, for, as we said above, sunlight increases the body metabolism and, since tuberculosis increases the metabolism, particularly catabolism, far above normal, it is apparent that efforts should be made to lower the metabolism rather than raise it. In extrapulmonary tuberculosis (tuberculosis outside the lungs, like tuberculosis of the spine, kidney, bowels, skin, etc.), however, heliotherapy is often of great help in aiding recovery. In chronic fibro-caseous pulmonary tuberculosis it is also often useful, but is never indicated in the exudative type or, as was said above, in any active case of pulmonary tuberculosis. For these reasons, sunbaths should never be taken by a person suffering with tuberculosis without first consulting a physician who has familiarized himself with the effects of heliotherapy. For the person with pulmonary tuberculosis, the mainstays of treatment are still REST, good food and fresh air.

When heliotherapy has been decided upon in a given case, it is important to follow a definite system of exposure. The lower, or less sensitive parts of the body, should be exposed first, and gradually this area should be extended to cover the whole body except the head and nape of the neck.

The feet are usually exposed the first day of treatment. This exposure should last for five minutes and can be repeated three times during the day if there are intervals of at least fifteen minutes between exposures. On the second day the feet are exposed ten minutes and the legs five minutes. On the third day the feet are exposed fifteen minutes, the legs ten minutes and the thighs five minutes. On the fourth day the feet should have twenty minutes, the legs fifteen minutes, the thighs ten minutes and the abdomen and hands five minutes. On the fifth day the feet get twenty-five minutes, the legs twenty minutes, the thighs fifteen minutes, the abdomen and hands ten minutes and the chest and arms five minutes. The sixth day the feet get half an hour and they are held at this point until the rest of the body is gradually increased by five minutes a day up to the half-hour period, after which the whole body can be exposed the same length of time. The exposures are now increased five minutes a day until two or three hours are taken every day. This is as much as is necessary to obtain any beneficial results obtained by exposure to sunshine. The time of treatment is divided equally between the two sides of the body and usually one exposure is as much as can be tolerated comfortably and safely, even where the patient reacts favorably to light. All persons do not react in an equally favorable way. In general, blondes react poorly, while brunettes react well, although there are many exceptions to this. Whenever the treatment produces irritability, fatigue, headache, dizziness, lassitude, elevation of temperature, increase of pulse rate or respiration, or drop of blood pressure, the exposure is too long. If these symptoms continue after the exposure time is diminished, it is an indication that the treatment should be discontinued, for in whatever type of case heliotherapy is used, it should always leave the patient feeling the same or better both during and after the treatment.

The best time for taking treatments with the natural sunlight is when the sun

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Keeping the Disease in Mind

INTENSIVE SANATORIUM treatment with its regular hours, its development of the necessary discipline

BY
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for the patients, its use of surgery, and its graduated exercise when getting well, offers the most satisfactory prospect for the patient with tuberculosis. But before the patient can be admitted to a sanatorium, he must be diagnosed.

Possibly the most exasperating thing to the T B specialist is to see case after case which had wonderful prospects of a cure if it had been discovered earlier. So that the words of Lawrason Brown at the masthead of this journal, "The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind," together with Osler's words to the man in general practice, "The leadership of the battle against tuberculosis is in your hands," definitely place the responsibility of saving lives and preventing new cases, by the early discovery of tuberculosis, directly in the hands of the general practitioners.

While it is hardly to be expected that a general man who sees comparatively few chest cases, should diagnose the very early or the very doubtful case, yet with the still large number of cases being discovered in the United States and the fact that most of them are in the far-advanced category, it seems to me that "keeping the disease in mind" is a most important admonition.

Its importance can best be illustrated by the following cases which recently passed through the admitting office of Olive View Sanatorium. These cases were so striking in the quite evident lack of using all available and recognized attempts to arrive at a diagnosis that I have summarized the cases in table form. The X in the various columns of presumptive and positive signs of tuberculosis indicate those symptoms complained of when the patient went to his physician before finally being diagnosed and admitted. Not all patients showed all signs and symptoms.

They rarely do. But with signs shouting for a chest examination, you will note that in not one case did

the previous physician use the common aids to diagnosis, sputum test and/or X-ray. All were far advanced cases when admitted.

I do not for a moment imply that the symptoms as shown by these patients, or by any patient, give one a clean-cut diagnosis, but given any one of the above cases, and with tuberculosis as prevalent as it is, then I do maintain that an X-ray and sputum test were indicated to *eliminate* tuberculosis, and that failure to use such aids bordered closely on neglect of duty. Or if there was any hesitation or doubt in the physician's mind, he should have sent the patient to a chest specialist.

There is no royal nor easy road to diagnosis, but it seems to me there are a few simple precepts which every one seeing the ordinary run of patients should keep in mind and use. Such precepts might be as follows:

(1) Be suspicious of every case of so-called influenza.

Many men believe this is often a flare-up of tuberculosis.

(2) Take a careful history of the patient and of *his family*.

(3) Use the stethoscope, X-ray and sputum.

(4) Having discovered a true case, have all contacts examined.

(5) Don't temporize with active tuberculosis any more than you would temporize with an appendix which needed active treatment.

(6) Send your patient to a sanatorium and under the care of a competent specialist.

I think it well to recall to your mind that tuberculosis is still the most important killer and disabler in the age grouping from 20 to 45, the most useful years of one's life. If the pendulum of diagnosis

could be swung from a majority of fairly advanced cases to a majority of early cases, and these cases could be given a period of intensive treatment in a sanatorium, the results would be little short of astounding

SYMPTOMS BY PATIENTS WHICH SHOULD HAVE CAUSED
TUBERCULOSIS TO BE KEPT IN MIND

No Pts	Cough	Sputum	Fever	Sweats	Hemorrhage	Anorexia	Weight Loss	Malaise	Pleurisy	
1	x	x	x							Symptoms 2 mos Went to physician, no X-ray, sputum nor chest exam
4	x	x		x			x		x	Symptoms started 2 yrs ago, went to physician, sputum ordered, no X-ray
5	x			x		x	x	x	x	Symptoms 1 year, went to various physicians, no sputum, X-ray, exam
6	x	x	x			x			x	Symptoms 8 months, no sputum, X-ray or exam
7	†	x				x		x		Symptoms for 1 year, no sputum, X-ray or exam Told to stop work
8	†	x					x	x		Symptoms for 4 years, no X-ray nor sputum by doctor during that time
9	x		x				x		x	Symptoms 3 months Went to doctors, No sputum, X-ray nor chest exam
11	x	x	x		x		x		x	Symptoms 11 months, same story
Specialists treated for "stomach trouble"										
12	x			x	x	x	x			Symptoms 4 months, same story
13	x	x		x						Symptoms for 2 months, same story Told to take deep breathing
14	x	x	x	x			x	x		Symptoms for 3 years, same story
15	x				x	x			x	Symptoms 2 months, same story, but told to stay in bed
17			x			x	x		x	Symptoms 3 years No X-ray, no sputum
18	x		x				x			Symptoms 3 weeks No X-ray, sputum or exam

† Hawking

Early Pulmonary Tuberculosis

†PART II —TREATMENT

IN A RECENT communication in this journal, we attempted to point out the necessity of making the diagnosis of pulmonary tuberculosis as early as possible.

We attempted to enumerate some of the facts which should point to the suspicion of this disease and lead to an intensive search for tuberculosis. In this paper we hope to bring out some equally important points in the treatment of this disease.

Volumes have been written, since the time of Trudeau, on the necessity of liberal diet, fresh air, and rest, but there has not been enough said about the use of collapse measures in early stages of this disease. Previously, we showed that a large proportion of the patients we see come to us with advanced lesions. One reason for this fact is that the patient does not present himself during the minimal stages. No less important a reason, however, for this deplorable state of affairs, is that all too often the diagnosis is made early, and the patient is advised to "take it easy." Instead of resting, the patient loafes for a few weeks or months, begins to feel better, and returns to his duties with his disease still actively progressive. Then there is that very large group of patients who are advised of their condition and are put to bed as their sole treatment. Some improve, and the bed rest is all that is necessary, on the other hand, there are many, so many, whose lesions fail to retrogress and who have their minimal lesions slowly but surely progress to advanced cases with cavitation.

A little active treatment at this point would stop the progress of the lesion and save the life of the patient, or at least months of invalidism. Furthermore, were active collapse measures used early and wisely, we would cut our percentage of advanced cases very markedly. We would have fewer cases for bilateral collapse

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therapy and not nearly so many needing thoracoplasty. In this enlightened age there are fortunately fewer and fewer in this former group who are advised simply to take it easy. Thanks to the persistent efforts of practically all writers and lecturers on tuberculosis, the medical profession and even the laity have come to more nearly realize the meaning of rest in tuberculosis. They have come to understand that there is no substitute for this all-important point in their treatment. They have come to accept the necessity of prolonged rest—prolonged to the point of arrest of the disease, whatever that may be in terms of months or years. May we add our opinion to this oft-emphasized point. We are wholly and entirely in accord with the advocates of rest. It is important, indispensable, and can not be replaced by substitutes. It is, however, not enough if we hope to reduce this scourge among young people.

Our emphasis will now be on those patients who have a definite tuberculous process and who are to have the best form of treatment we can offer. We shall enter this discussion with one premise—when the diagnosis of pulmonary tuberculosis is made, and the stage of the disease is determined, we turn our whole thought to the arresting of this process in the most effective way possible and with the least sacrifice on the part of the patient in time and in loss of tissue. The most effective way is the employment of collapse therapy and bed rest. We insist that collapse measures should not be used as the "mop-up squad," as an editorial in these pages so aptly put it, but should be used to prevent the necessity of having a mop-up squad.

In the past so many phthisiologists have not looked with favor upon collapse measures. When used at all, they were used only as a last resort, and because of their use in this manner, their success has suffered proportionately. And so long as they

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†Part I in July issue

are used as a last resort, they will be looked upon as deserving little consideration early in the course of the disease. When, however, we can come to look upon collapse as equal in importance to, if indeed not superior to, bed rest, our patient will be benefited proportionately, and our statistics on the efficacy of collapse will improve, then we will realize it is the first line of defense rather than the "mop-up squad."

We feel that if a patient with a very early lesion without cavitation can get well with bed rest alone, he can get well quicker and much more certainly with the added help of a temporary phrenic interruption (not exeresis). Therefore, we feel that a patient with this type of lesion should have this operation immediately. The point of time is important to most patients, of much greater importance, however, is the likelihood of complications if bed rest alone is depended upon. They are so much less likely, if his rest is supplemented with collapse procedures. Those complications are cavitation, hemorrhage, progressive spread of the pathology in the same or the contralateral lung, the spread to other organs, and the formation of pleural adhesions. The temporary phrenic interruption has been developed to such a point that it is practically without danger, the hemi-diaphragm usually resumes its function in six to nine months, as opposed to the permanent paralysis of phrenic exeresis, and no harm has been done to the patient. When the diaphragm is beginning to resume function, if the lung is not satisfactorily healed, it is perfectly permissible and simple to repeat the operation. This is done, of course, only when it is believed that a repetition of the operation is beneficial.

The decision as to the advisability of repeating the operation rests upon a very careful study of the patient. Consideration is given to his past and present status, to the onset of the disease, to the class of the lesion throughout his course while under observation, to the way the patient has reacted to treatment, and to the progress that has been made to date, and, most

of all, consideration is given to determining if another phrenic crushing will be adequate to effect a cure, or whether other measures should be instituted. In this connection, we want to bring out the most important single point in the management of pulmonary tuberculosis, viz., when one method of collapse has been used and has failed to accomplish the desired purpose, one should immediately use another, or add another to complement it, and use these procedures successively or concurrently until the process is arrested. In other words, because of the fact that a patient has had a paralysis of the hemi-diaphragm without causing the improvement in due time, which you are justified in expecting, is no reason why he should not be given a pneumothorax. On the contrary, the failure to improve makes pneumothorax all the more imperative. Some of the cases do not respond sufficiently to the relaxation afforded by diaphragmatic paralysis and require the added relaxation of the pneumothorax. This should be instituted whenever it becomes apparent that the former operation was not sufficient. Let it be said here that an active lesion in the opposite lung does not contraindicate these measures. On the other hand, we have seen the contralateral lung clear up rapidly so often when its fellow is under collapse therapy, that we are convinced that bilateral lesions make it even more imperative to collapse the worse lung than if the lesion were unilateral.

If cavities exist when the patient first presents himself, or if cavities develop while under observation, that calls for unceasing efforts to close those cavities. We mean "unceasing efforts" literally—begin with the most effective measure in the largest number of cases, pneumothorax, and use it until the lesion is cured or until it is apparent that the pneumothorax alone will not effect an arrest, then follow immediately with a measure or measures which will be effective. The effort must be unceasing and continuous. Pneumothorax is practically always indicated where there are cavities. Again, should

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The Community Tuberculosis Program

THE PRIMARY MAXIM regarding tuberculosis should be *Once tuberculous, always tuberculous*

BY
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This does not mean that those so afflicted should abandon hope, but that such individuals must face the facts and adjust themselves to very definite rules of living. They must accept this adjustment in the same manner as those who are otherwise handicapped, the blind, the deaf, the crippled and the insane are examples found in large numbers in every community, who have oriented themselves to a new or different mode of life from their more fortunate fellow-citizens. State and social agencies have assisted in tuberculosis programs all over the country, a vast amount of work has been done in case finding, diagnosis and treatment of active disease, but the problem of after care and rehabilitation is largely left to individual expedience.

Human progress has been accompanied by advances in art, literature and science. Public health is so important a part of the latter that had it been neglected, it is doubtful if we could have experienced any advances in the others. Its recognition is relatively recent in the history of civilization, yet, as our culture has progressed, it has been marked by steadily increasing perfection in the science of preventing communicable diseases. It is safe to say that historians of the future will mark that civilization most advanced in the nation that had the best public health program. Humanity, like all other nature, learns to protect itself by various compensations. Scientific public health methods will provide the necessary "compensations" for the human race against disease.

It is impossible to predict the exact means. It may come about by practicing physicians realizing their duty in a broader interpretation of responsibility to the people of their communities, or by that

other extreme—State Medicine. If the medical profession does not provide the program, the people will

provide it for them. Human nature being what it is, man will grope for solutions, blindly perhaps, committing errors doubtlessly, but ever onward. It is the duty of the medical profession to guide them truthfully, it is also necessary to the very life of our present system of medical practice to do so.

The Research Committee on Social Trends reported January 1, 1933, "Unemployment insurance, old age pensions, and a consideration of compulsory health insurance" (The italics are mine). The average practicing physician, given the training and equipment he now has, does not attempt to solve the problem of blindness, deafness, insanity and many other physical handicaps. Alone and unaided by community health organization, unprepared through lack of previous special training, he can not cope successfully with the tuberculosis problem.

A well-managed and well-thought-out tuberculosis program is an essential part of every public health organization, whether state or municipal. This article is chiefly concerned with the latter, but a large part of the program is equally applicable to county health organizations. Such a program should stress

(1) Education, both for the public and the medical profession

(2) The importance of the part played by the general practitioner

(3) Case finding, initial and continuous

(4) Maximum use of clinics, open air classes, preventoria and sanatoria

(5) The importance of a high level of child health

(6) Detailed and continuous study and analysis of the local problem

(7) Maximum use of social welfare agencies in obtaining aid

(8) The program must be emphasized

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in keeping with its importance but should be an integral part of the general health program

There are a number of primary considerations

(1) The early and frequent infection of children

(2) Difficulty of early diagnosis

(3) Dormant nature of the infection and mildness of early cases

(4) Limitation of our knowledge of the disease

(5) Effect of age, race, environment and resistance

(6) Long duration or chronicity of the disease

(7) The cost of medical care and the economic factor involved

(8) Rehabilitation and after care

(9) Relation of the disease to industry and the industrial hazards involved

The objectives of the program are decreased morbidity and mortality and a corresponding reduction in the economic distress that either causes or results from tuberculosis. A variety of approaches are utilized to attain these ends, the first of which is properly the maintenance of a bureau of tuberculosis by the local health department. Its functions are to correlate and coordinate all tuberculosis activities in the community whether official or voluntary, including case and contact finding. It should secure prompt and accurate reporting of cases, including those in hospitals and other institutions. The bureau must tabulate and analyze morbidity and mortality statistics and maintain a complete and detailed record of all known cases of tuberculosis and maintain a close relationship with all available hospital facilities.

Educational activities will include radio addresses, talks to parent-teacher associations, welfare workers and other interested groups. This educational approach must be very persistently sustained at all times, circular letters, bulletins, posters, newspaper articles, window displays, floor displays at conventions and bazaars, and moving pictures will, in time, bring about a public consciousness of tuberculosis. It

is by these methods, the National Tuberculosis Association and the numerous state associations have done such splendid work. Not the least of the educational measures is the relationship established between those in charge of the program and the medical profession, particularly the practitioners in any given community. Physicians engaged in general practice and industrial medicine are usually the first to see the tuberculosis case. They see him at a time when his disease is in the early stages, when a proper diagnosis is so important and the correct advice and management of the case are more needed than at any other time if the patient is to be saved and those around him protected from infection. I have often noted the enthusiastic reception by a group of physicians of a well presented talk or paper read on tuberculosis even when the subject matter contained much that may have been time-honored data familiar to every one present. Reiterated facts, if well presented, seem to receive the deepest attention and may recall some forgotten points to the mind of the hearer. The man in general practice today has an ever-increasing burden of information to store away for instant use as need arises. Few of us can hope to keep so much in mind and the facts of the modern aspects of tuberculosis are no exception. It must be remembered that tuberculosis is only one of the many conditions the general practitioner encounters on his busy round. The circular letter or bulletin sent out from the central health department office to the doctor by mail has a valuable educational place in the program. Manufacturers of good, bad and indifferent drugs and nostrums have long ago learned how great an influence can be exerted by advertising matter sent to the doctor in his morning's mail and, incidentally, many so-called "popular remedies" were first introduced to the public by using the family physician to do it! Surely the war upon tuberculosis might, in all honesty, be carried into the enemy's country through the doctor and with his knowledge and cooperation, he will be a better physician

and the public will be better served

The doctor, on the other hand, must help by reporting cases promptly to the local health officer. Tuberculosis is a reportable disease but unfortunately the law is honored more in the breach than the observance. An interesting paper might be written upon why physicians do not report tuberculosis, suffice it to say many cases are not reported. The reporting of cases should not be permitted to impose any hardship upon the physician making the report and if this phase of the problem is handled with diplomacy he will be saved any embarrassment. In Baltimore, the physician making the report is called by telephone and his wishes consulted and respected in the matter of supervision he desires the health department to exercise in the treatment of the case and the handling of contacts. This plan has not only led to a rapid increase in the number of reports received, it has also tremendously increased the number of cases sent to the municipal clinic. In 1934, about twenty-five per cent of all cases admitted to the municipal clinic were referred by physicians, and this year the percentage will be even greater.

This matter of reporting tuberculosis calls for an honest facing of the facts. There appears to have been built up around the notification an element of secrecy. True, the report is a confidential matter, but in our efforts to preserve this confidence, the patient is permitted to live where and how he likes, to go about the community when and where he pleases and he is not prevented from working, if able. In this manner he is likely to infect many who come in contact with him. A few laws regarding careless spitting, the promiscuous use of drinking cups in public places and against known sputum positive cases from handling food have a doubtful value in curbing the activities of the open case. The very early case with no demonstrable tubercle bacilli in the sputum and the arrested and fibroid cases may be said to be non-infectious. Every other case is a grave menace to the community. I venture to say many an open

case of tuberculosis causes, in the final analysis, as many innocent persons to die through infection, as does a maniac with homicidal tendencies.

The active case of tuberculosis should be removed to a sanatorium and kept there until cured, or, if he becomes too ill to afford hope of recovery, he should be placed in isolation in a nursing home or similar institution for the treatment of such cases. Late and infective cases should never be permitted to remain at home and the local health officer should be empowered to deal with the recalcitrant case by removing him forcibly if necessary. I do not believe such a measure would require frequent use. It has been my experience that eventually the most stubborn individuals will be persuaded to go to a sanatorium, the difficulty seems to lie in keeping him there. Patients break rules and are dismissed from sanatoria, often being refused readmission. It is much more difficult to persuade this type of case to re-enter an institution. The advent of artificial pneumothorax and surgery in the treatment of the disease should help in reducing the antipathy to compulsory hospitalization by speeding the date of the patient's return home.

Notification of a case of tuberculosis should afford the local health department the opportunity to make at least one visit to the patient's home. Contact thus established between the public health nurse and the patient or his family may lead to the prompt diagnosis of the disease through the examination of contacts. It is not necessary to divert these individuals from the private physician to a clinic, they may be sent to the doctor's office and he can thus remain in complete control of the situation. Many physicians welcome the advice to contacts by the visiting nurse because they have felt reluctant to advocate it themselves for fear of being misunderstood. The average physician is so honest he will bend over backward in his effort to avoid the appearance of soliciting work. On the other hand, as is often the case, the family that has spared no expense for the sick patient, is reluctant to

have examinations of the apparently well members, tuberculin testing of children and possibly x-ray study, either because of economy or indifference. In such instances, local health authorities should be ready to stand by and assist the physician by arranging for the free examination of the contacts. Finally, many physicians see the patients in their offices and know nothing of the home environment. The visit to the home by a competent and sympathetic nurse will bring to light many of the pitiful conditions under which these patients live and afford some measure of relief by directing them to welfare agencies, to say nothing of the many duties she may find to perform herself.

Open Air Classes and Preventoria

It is very likely we shall have to revise our opinions as to the value of the open air class to the tuberculosis problem. In the antiquated buildings of former years, any room with open windows and a breath of fresh air was probably much better than the superheated atmosphere in which most of us wrestled with the three R's. Today, every modern school building is properly ventilated and not a few are air-conditioned. The real value of the open air class, in my opinion, is derived from the extra food furnished children in nearly all of these classes. Add to this that membership in such a class is a constant reminder to the child's parents to afford him extra care similar to that which he receives in the class-room. These children do receive a certain amount of rest but at best it is inadequate and usually consists of an hour reclining on a cot. Rest, to achieve any great benefit, should be taken in larger doses. It is quite evident there is a limit to the amount of time a school can devote to the bed-rest of pupils without seriously interfering with its function of educating them. In brief, the rest had better be administered in the home with the cooperation of parents. Failure to obtain this cooperation nullifies any good the open air class can hope to accomplish. In this connection I should like to observe the open air class may have quite the reverse of the anticipated parental reaction.

Many people believe that if their children are receiving open air class care, this will suffice to keep the child in perfect health. Instead of engendering a heightened responsibility for the child's welfare, such individuals actually afford him less care and attention in his home life!

The preventorium is really still in the experimental stage. Our knowledge is still too limited to condemn or to indorse them wholly, but it is likely that preventoria can be utilized for a vast amount of good. It is only the methods used that are in question. I have recently made a study of ten children who had received preventorium care and later were sent to a sanatorium, in other words, an effort was made to find out why the preventorium did not "prevent." The study was made from the case histories of a local clinic and the records of a nearby preventorium. It should be noted that these ten cases were the *only* ones we could find in the six years the institution has been in operation. The group was too small for statistical study but detailed analysis of each case provided us with information of some value. One of the cases was merely sent to the sanatorium as an optional patient, having been offered this or further preventorium care. The sanatorium was elected. Another case remained in the sanatorium but six weeks and was dismissed as a behavior problem just as he had previously been forced to leave the preventorium for the same reason. He has not developed the disease subsequently and probably was not active. Three of the children were ex-sanatorium cases prior to their admission to a preventorium. Four were impossible behavior problems and could not be kept in a preventorium long enough to accomplish any beneficial effect. One of the cases developed his tuberculosis nearly four years after his preventorium experience and then only after fresh exposure to a new source of infection. There were only three cases that developed tuberculosis after having been in the preventorium in which neither behavior or previous sanatorium experience did not play a part. In one of these, the child had been severely in-

fects previously and it is thought, in the light of later knowledge, she should have been sent to a sanatorium in the first place. The second, we have every reason to believe was saved a much more serious break-down by her earlier experience in the preventorium. The third was an unfortunate child whose home environment was indescribably bad. This child made splendid response to the preventorium regimen but lost it rapidly under home conditions.

The study of these and other cases leads me to believe the prolonged stay (at least three months) in a preventorium under conditions approximating a sanatorium will do much to prevent the development of the disease. The child should not be dismissed to return to a home where he will be subjected to further exposure to an open case of tuberculosis, this merely delays the evil day of disaster. If the preventorium admits ex-sanatorium cases, these should be admitted promptly after discharge from the sanatorium and the preventorium might well be the stepping stone between sanatorium and home life and so play a part in rehabilitation.

The Tuberculosis Clinic

The clinic constitutes one of our most important approaches. It is strategically favorable for the dissemination of a great deal of educational material and affords opportunities to teach physicians, nurses and social workers obtainable in no other way. It brings together the diagnostic methods used in recognizing the early ambulatory case with the social and economic phases of treatment and may well be used for the administration of refills in pneumothorax cases. It is headquarters for field tuberculosis work. Not the least of its activities is the maintenance of a consultation service for the general practitioner who wishes to refer his private patients for x-ray and physical examination or for tuberculin testing. It should be the source of supplies such as containers for specimens of sputum, paper napkins, disinfectants and sputum cups. Every patient should receive full instructions and

advice and it should be the clearing house for all cases sent away for institutional care. The clinic may play an important role in the examination of cases for industrial clinics, acting in an advisory capacity to personnel or employment directors in the supervision and management of tuberculous employees, particularly those who have returned from sanatoria and require periodic examinations during their first year or so. In the same manner, the clinic maintains a close relationship with social welfare agencies, examining many applicants who apply to the agency for relief and in turn referring many families and individuals who may require relief during the period of treatment and rehabilitation of the patient.

The clinic should be equipped to carry out every procedure in diagnosing the suspected case. Freshly prepared dilutions of tuberculin should be available for the Mantoux test and the clinic should have an x-ray and fluoroscopic apparatus installed on the premises. The location of the clinic should be convenient to available street cars or bus service and if there are more than one clinic, it is well to establish boundary lines each is prepared to serve. The building should be owned by the municipality it serves, should be kept freshly painted and its rooms should be bright and cheerful. A definite hour should be designated for the admission of patients and only under exceptional circumstances should patients be admitted after the time stated. Courtesy, sympathy, dignity and a sense of humor are indispensable in gaining the confidence of patients. The human side must never be forgotten. Patients should be assured privacy in dressing and examining rooms. Confusion of any kind must be avoided and quiet is essential. Fine tales can not be heard in the presence of extraneous noise and a patient's life may depend upon the quiet and order maintained in the clinic.

Nursing Care

No program for the control of tuberculosis can hope for success without the assistance of visiting nurses. It is a fact

often overlooked that the *first* public health nurses were tuberculosis nurses. The idea was developed in the early days of tuberculosis clinics because it was felt necessary to have patients followed in the home after diagnosis in the clinic. Later, to avoid duplication, these nurses assumed the duties associated with such activities as prenatal care, school hygiene and other medical inspections. To a degree, this was unfortunate, as tuberculosis is often relegated to the background in the generalized plan of today. If proper emphasis is placed upon their tuberculosis work, there is no particular reason to separate the tuberculosis field work from the department of general nursing. We must bear in mind, however, the average nurse has little opportunity to familiarize herself with this disease during training. Ward and operating room work in most hospitals offers few opportunities to study tuberculosis or any other phase of public health. This neglected feature of her training must be remedied, either during her training or afterward, and *before* she enters the field of public health work. There should be some effort made to familiarize the nurse in training with the modern aspect of public health methods, specialized training in tuberculosis might be given during or after graduation before she is admitted to the responsibilities of health department work and many nurses now engaged in public health work should be afforded a special course in the latest phases of tuberculosis field work.

Nurses engaged in tuberculosis work should have an intimate knowledge of case finding methods, the keeping of proper records, a knowledge of the disease, an ability to obtain relief for those in distress, and above all, an ability to teach. She must be able to instruct the patient and family, interpret the physician's orders, and afford wise counsel in a language they can understand. This is a tall order, but to be successful, she must combine all of these virtues with tact and cheerfulness.

Rehabilitation and After Care

This is the most difficult part of the whole tuberculosis problem. The cured case must remain so if he is to avoid being an economic liability to the community. Most of the schemes for vocational training and rehabilitation are very expensive undertakings, and few communities have the temerity to embark upon them without some assurance of better results than can be demonstrated. Certain it is that at least twenty per cent of the cases remain permanent medical problems who might be classed as unemployables. Forty per cent return to their previous occupations on discharge from sanatoria, and the remainder will require special handling to refit them for a life of usefulness. This does not take into account the second group among whom there will be many relapses and who can only be taken care of by correlating the tuberculosis program, probably through the clinic, with industry.

The purpose of the scheme for rehabilitation must be to continue the process of healing in diseased lungs and not to become a species of concentration camp for incurables. Pneumothorax treatment will probably solve the problem for a great many of these cases. With the improvement in technique more and more clinics will adopt this method of treating post-sanatorium cases. In the meantime, the patient must be trained in some useful occupation. This instruction may be begun before he leaves the sanatorium, even early in the course of his treatment. Many sanatoria throughout the country have already offered facilities for special courses by coordinating this phase of treatment with the educational systems of their states, or through the Federal Board for Vocational Education. England has tried the industrial colony more extensively than this country, but as mentioned, the cost is so great few communities can afford them unless they can be made self-supporting and this appears to be rarely possible without confining the work to

such a narrow field of endeavor as to create a surplus of workers in the type of occupation for which they are trained

*Age, Sex, Race and Environment
in Tuberculosis*

No program can afford to neglect the effects of age, race, sex and environment. Tuberculosis is essentially a disease of the young. The early infection of children is too well known to require discussion. Year after year, in Baltimore, children admitted to the clinic are more than fifty per cent positive tuberculin reactors. They are, of course, contacts in the great majority of instances, but it is safe to say that twenty-five per cent of school children in large cities will be found to be positive reactors. The incidence of infection appears to be falling slowly but the rate is still very high. About two per cent of all children will be found to have demonstrable changes by x-ray examination but it is interesting to note the same percentage holds true of any industrial group. It is remarkable how little we really know of the mechanics of these childhood infections, and it is amazing what differences of opinion exist in reference to etiology, pathology and treatment of the childhood type of disease. In the Municipal Tuberculosis Clinic in Baltimore, we have long considered each case a problem unto itself and dealt with it accordingly. Experience would suggest that we are over-emphasizing the examination of young children when the group most in need of supervision is the high school student. The disease slays more young women between the ages of eighteen and twenty-five years than any other disease. It would appear from this the mass survey of young working women and girls as recommended by the White House Conference would be a sound procedure. In those communities with large Negro populations, no opportunity for mass survey of this race should be neglected. The Negro enters into our life a great deal more intimately than is generally realized because of the frequency of employment of this race as domestics,

waiters and like occupations in which he is in immediate contact with our homes, the clothes we wear and the food we eat. His susceptibility to tuberculosis is marked and any program which omits a thorough approach to the problem through the Negro population of its community is inviting failure.

The home and working environment plays a tremendous part in the tuberculosis problem. The beginning of this century has seen great strides toward better housing and improved working conditions. Hours of work have been steadily reduced in all branches of industry, and this, coupled with improved sanitation, better food control, more sensible clothing and widespread indulgence in out-of-door sports and pastimes have largely contributed to a lowered tuberculosis morbidity. The pasteurization of milk and the inspection of cattle for tuberculosis are simple examples of food control that have doubtlessly saved thousands of lives. Tuberculosis death rates rise in direct proportion to the amount of crowding in any given section of the community, we are now slowly outgrowing the alley and tenement of the past. Slum clearance is actuated by a worthy motive, but is too costly to be fully carried out. Destruction of festering blocks of property in large cities may accomplish a certain amount of good to the extent they remove so many dark and badly ventilated houses favorable to the growth of tuberculosis. Destroying one or two blocks, or even more, merely scatters the population of those blocks to other neighborhoods which in turn become slums. Such a program can not be effectual unless carried out on a very much wider scale than the average community can afford to attempt, but if it is persistently pursued, all buildings capable of conversion into slum districts are eventually destroyed.

It is of interest that most of the improvement in living and working conditions has come about gradually and is not the result of any plotted program, but it has done more than anything else to reduce the incidence of tuberculosis. This

is particularly true of industry, where better working conditions and care of employees has been found to yield large dividends. Most industrial plants that have become awakened to the tuberculosis problem found themselves already equipped with clinics, physicians, nurses and welfare services that had been inaugurated for other and more general reasons. It is the small plant and store which the municipal clinic can help most in the handling of tuberculosis cases as they arise.

In conclusion I should like to call attention to the epidemic nature of tuberculosis. We know from observation that certain diseases become epidemic in cycles, measles and influenza are notable examples. Since the beginning of this century there has been an almost uninterrupted decline in the mortality rate of tuberculosis. Most of us are familiar with the graph published by the Metropolitan Life Insurance Company in its Statistical Bulletin, Vol. XIII, No. 12, December 1932, which is plotted from the death rates from all forms of tuberculosis in the original registration states and District of Columbia. A mean line drawn through the curve drops to zero in 1941. Later computations have placed this a year or two further on, but in any case the most sanguine can scarcely believe the tuberculosis death rate will reach zero prior to 1950. As was to be expected, the curve straightened out somewhat in 1933 and 1934, and this year we are witnessing, in Baltimore, at least, a marked upward trend in the morbidity and mortality rates. I venture to believe this will be borne out in many other localities.

Tuberculosis is an epidemic disease, whose cycles move in periods of many decades. It is quite possible we are surviving two, and possibly three epidemics

of tuberculosis, one which attacked old persons and is about exhausted, one which attacked persons in the forties, and is also about over, and a more recent epidemic that attacked young people. This would account for the large number of youthful persons who succumb to the disease and several other incongruities of tuberculosis as we see it. In the course of such epidemics, there must be wide variations from time to time with the death rates working downward over the long period but rising at intervals due to such cataclysms as the late war, the influenza epidemic and the present depression. Certain it is, we are due for such a rise. While the depression has driven many persons to clinics and more reporting of the disease is likely from this source than the private practitioner, it will not explain the sharp rise in both morbidity and mortality rates that appear imminent. The economic crisis through which we are passing has caused people to live in crowded conditions, to subsist on less food, to work longer and harder when work was to be had, and to forego the rest, recreations and vacations they have known in the past. We are nearing the end of the sixth year of the depression and this involuntary reduction in the living standards of so large a part of our population is beginning to make itself felt. Tuberculosis is a slow-moving disease, and we are probably seeing the result of infection that occurred three and four years ago or of relapses that began at that time and are just making themselves manifest. We may well expect to witness a rising morbidity and mortality rate in tuberculosis and it may be that when prosperity makes its long awaited turn around the corner, it may find us embattled with an epidemic of this disease.

SUNLIGHT IN TUBERCULOSIS

is relatively cool, as in the morning or late afternoon. This is especially important in summer and in low altitudes, although in the highest altitudes, and in winter, the air is often cool enough at all times. The sunbath, when accompanied by a hot-air bath, becomes a veritable Turkish bath,

(Continued from page 10)

the effects of which are the opposite of those desired, i.e., fatigue and depression result instead of the bracing and stimulating effect which should follow proper application of the treatment.

Today many lamps are manufactured to produce artificial ultra-violet light

These lamps are often convenient and in many localities are necessary because of the lack of sunlight. The results achieved with them are very satisfactory, but are never as successful as natural sunlight. Whenever lamps are used, the room should be ventilated well, for the moving air is one of the necessary features required for good results with heliotherapy. The time of exposure with most lamps should be one half of the time used for natural sunlight, the lamp being at a distance of thirty inches from the body. When the distance from the lamp is shortened the time of ex-

posure should be proportionally shortened.

The discovery of the curative powers of light has added an effective agent to the armamentarium of the physician and has aided many sufferers in their struggles to obtain health. The good results produced by this helpful agent, however, depend solely upon its proper use, for where it is used indiscriminately, it has frequently produced harm instead of benefit. It is hoped that in the future all users of this method of treatment will seek competent advice before they expose themselves to ultra-violet light.

EARLY PULMONARY TUBERCULOSIS

(Continued from page 14)

there be something to prevent the closure of these cavities by pneumothorax, consideration is given to what may be added to this pneumothorax to make it successful. Many unsuccessful pneumothoraces have been changed into successful ones by doing a phrenic interruption in conjunction with the pneumothorax. Adhesions attached above and to the diaphragm often act as a guy-wire, pulling open the cavity with every respiration. Often relaxation by paralysis of that half of the diaphragm will allow the pneumothorax to collapse the cavity which otherwise could not be closed. Likewise cauterization of adhesions, when feasible, will convert an unsuccessful pneumothorax into a successful one. In some cases open operation to divide adhesions is necessary and is indicated when the closed method fails. Finally, if the lesser measures have failed to bring about a satisfactory termination of the disease, thoracoplasty must be considered, and has saved many lives that were hopelessly doomed without such surgery.

Now to reiterate and summarize (1) Where there is pulmonary tuberculosis, it is treated best by collapse measures irrespective of stage of the disease. We are convinced that there will be fewer cases with cavitation and extension of lesions, if they are treated with collapse before cavitation occurs. Furthermore, there will be fewer of the patients who present themselves with cavitation to go on to far advanced lesions if they receive effective collapse therapy as soon as the diagnosis is made. (2) When and if one measure fails, one should go immediately to other measures and continue so, one after another, or concurrently, until the disease process is arrested. (3) Collapse therapy is not a last resort method. Its percentage of cures will be in direct proportion to its use in earlier cases, and morbidity and mortality will be proportionately reduced. (4) Any patient with enough pulmonary tuberculosis to be diagnosed as such should be treated with collapse therapy in addition to bed rest.

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ABSTRACTS



This department is devoted to abstracts of articles carefully and judiciously selected by the Editorial Staff

HAMILTON, C E & ROTHSTEIN, EMIL
Air Embolism Journal of the A. M. A. Vol
104, No 25, June 22, 1935

Cases of air embolism may be divided into two large groups—one in which air gains entry to the peripheral nervous system, and the other in which air enters the pulmonary venous circuit

Air embolus resulting from air entering the peripheral circuit has been encountered in practically every surgical field. The entrance of a small amount of air in the peripheral circulation has no effect—being simply absorbed in its passage through the lungs—but the entrance of a large amount (160 cc in dogs) interferes with the efficacy of the right heart action. Owing probably to the easy compressibility of the air, the valves are not properly opened and the circulation comes to a standstill. To this is added the development of an acute hypertension of the lesser circuit due to a very diffuse capillary block of the pulmonary vessels by air bubbles.

Entry of air into a peripheral vein is possible (a) when a vessel is only partly severed, preventing collapse, or even in complete severance when the surrounding tissues are firm, thus preventing venous collapse and retraction or (b) the venous pressure is negative and the air pressure positive. Probably the most frequent source of air embolism is in the region of the great veins of the neck in accidental wounds, or following thyroid or other operations. Here both of the above conditions exist. Fracture of the long bones, especially the tibia, manipulation of the puerperal uterus, irrigation of the maxillary sinus, injection of air into the bladder, etc., have been followed by air embolism.

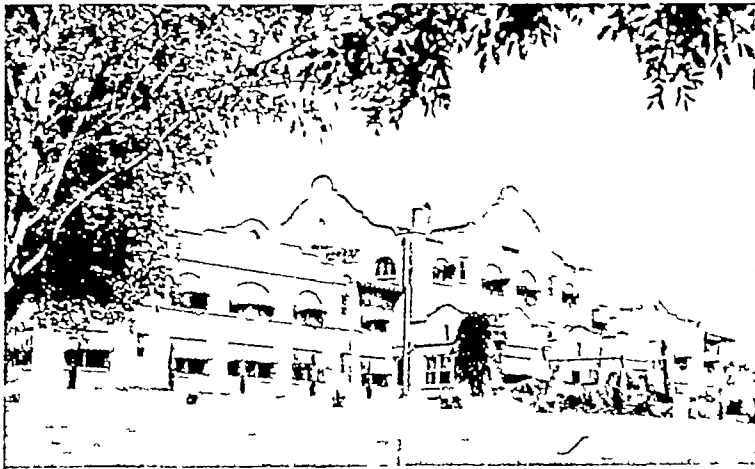
The authors are particularly interested in air embolism resulting from air enter-

ing the pulmonary venous circuit—the majority of which follow artificial pneumothorax. Other causes are injury to the chest wall and lung, pleural lavage in empyema, etc. When air enters the pulmonary venous circuit it passes through the left side of the heart, and is pumped to the peripheral circuit—hence possibly to the cerebral circulation. The authors report nine cases of air embolism occurring during artificial pneumothorax.

It is pointed out that the tuberculous lung is fibrotic, firm and frequently adherent, with thick vascular pleural adhesions and, therefore, normal vascular collapse and retraction of the pulmonary veins is not present. Also the pressure in the pulmonary veins is normally 14 to 16 cm of water less than atmospheric and from 5 to 6 cm of water less than the intra-pulmonary pressure and this difference is accentuated when the air pressure is increased by the pneumothorax machine or by coughing.

The perforated vessel through which the air enters may be in the lung or in a vascular adhesion. The air may come from one of four sources: (a) It may be induced by the operator from the pneumothorax apparatus, (b) it may be sucked in from the tubing of the manometer, (c) it may be sucked in from an alveolus or bronchiole, the bevel of the needle acting as a connection between the air sac and the blood vessel, or (d) by a similar action it may be sucked or forced in from the pleural space if a partial pneumothorax already exists. Air embolism occurs about once in every 500 to 1000 pneumothorax treatments.

It is pointed out that practically always on introduction of the needle in these cases the manometer readings are found to be unsatisfactory, resulting in either no



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fluctuation or those characteristic of intrapulmonary pressures ($-2, +2$) The symptoms of embolism may manifest themselves before any air is introduced, or after a variable amount has been allowed to run in—anywhere from 10 to 500 c c Similarly they may appear when the needle is in place, immediately on its withdrawal, or after several minutes

As a warning sign the patient may cough up a small amount of blood, or blood may well up through the needle Often the patient will first complain of feeling queer, or of local pain, or of severe coughing The first sign is usually pallor, followed by intense cyanosis, bradycardia, loss of consciousness, convulsive twitching, apnea or respiratory difficulty, urinary or fecal incontinence and vomiting Focal neurologic signs may appear at once or not until the elapsing of a variable number of minutes Any part of the brain may be involved, the commonest of the easily recognized syndromes is hemiplegia

Prognosis—Air embolism is fatal in percentage varying from 15 to 50 In this reported series the rate was 22% On the other hand, the prognosis of the patient who survives the first ten or fifteen minutes after the accident is good, and after one hour has elapsed the danger is very slight, even in the face of persistent coma or paralysis The prognosis of recovery of the focal neurological lesions is also good

Therapy—Prophylaxis is the most important, use of a blunt needle, use of especially constructed syringes, use of air under negative pressure, especially in the first injection, place head of the patient downward, keep the patient on the table for ten to fifteen minutes after injection, etc Air should *never* be given unless the fluctuations are those of intrapleural pressure

Treatment after cerebral embolism has occurred is symptomatic and may vary from simple reassurance to epinephrine (intravenously or intracardiac if necessary) caffeine, artificial respiration, and

the like, depending on the manifestations in the individual case If there are no other contraindications, artificial pneumothorax may later again be resorted to

It is frequently difficult to differentiate air embolism from pleural shock The two phenomena may produce identical primary symptoms, but focal neurological conditions such as hemiplegia are not usually seen in simple pleural shock In any event, the treatment of the two conditions is identical

GARRISON, HARVEY F Lipoid Pneumonia in Children Southern Medical Journal 1935 28 4

The author reports a case of Lipoid Pneumonia due to the aspiration of liquid petroleum He also cites forty-one cases reported by other observers of pulmonary inflammation due to the aspiration of lipoids

The increasing use of a variety of oils in pediatric practice, in the treatment of vitamin deficiencies, in disturbance of the gastro-intestinal tract, and by the local application of oils into the naso-pharynx, larynx and trachea has occasionally been attended with unexpected pulmonary disease

It has been conclusively shown that small amounts of oil administered by mouth and in the naso-pharynx, may, by coughing, strangling, etc, be aspirated into the trachea, ultimately reach the alveoli, and produce a lipoid pneumonia

In the cases reported only a few have been diagnosed before death, the great majority have been diagnosed post-mortem This is mainly because the initial lesion in the lungs is not sufficiently widespread to show any characteristic clinical or roentgenological signs

It has been suggested that a diagnosis can be made if there is a history of administration of an oily substance via the naso-pharynx or orally over a long period of time, which, if followed by a hacking cough, rapid respiration without dyspnea, a typical pulmonary consolidation, which is central posterior and mostly on the right, when present in a debilitated infant, should make one suspect lipoid pneumonia



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Tuberculosis, must of course, be ruled out. The finding of mononuclear cells containing lipid substances in expectorated material has been suggested but not conclusively proven of diagnostic value.

In the light of the present findings relative to the use of lipid substances it would seem to be the best policy to sound a note of warning and to advise the necessary precautions as to their general use.

WILSON, EDWIN B and MAHER, HELEN C
Cancer and Tuberculosis, with some Comments on Cancer and Other Diseases. *Am J of Cancer*, 1932, xvi, 227-250.

From pathological and epidemiological evidence opinions at variance with one another have been arrived at in respect to the simultaneity of cancer and tuberculosis. Some have maintained that cancer and tuberculosis are antagonistic, some that one disease favors the occurrence of the other, and some that the incidence and progress of the two conditions are independent. (This question has been considered previously in the *ANNALS* 1929, iii, 495-500, and 1929, iii, 501.) The difficulties involved in arriving at a sound judgment and the various statistical fallacies which must be avoided or minimized are considered in the course of a mathematical treatment of the problem. It was concluded that there seems to be little or no evidence in favor of an antagonism or dissociation between cancer and tuberculosis, and a considerable variety of evidence in favor of a slight degree of positive association between the two. Until better estimates of morbidity rates are available one should not be dogmatic over the matter and may well admit that for practical purposes cancer and tuberculosis may be regarded as independent. There seems to be considerable evidence that cancer of the esophagus is associated with pulmonary tuberculosis, as might perhaps be natural if the condition resulted in a long-continued malnutrition. At present there seems to be no material which should lead to a judgment as to whether cancer and tuberculosis tend to originate in the same persons because of constitutional diathesis, or whether the association might

result merely from an invasion of one of the processes by the other or a lowered resistance to the progress of one of the diseases owing to a debilitation by the other.

WEBB, GERALD B. Pulmonary Tuberculosis
Annals of Int Med Vol 2, No 1, p 56

Infection

Adult ulcerative pulmonary tuberculosis exemplifies the achievement of the life cycle of the human tubercle bacillus. Egress of the parasite is now accomplished so that it is free to attack other victims. It has been long recognized that adult pulmonary tuberculosis is a reinfection of a patient previously infected and partly immune, but whether such infection is endogenous or exogenous is a topic extensively debated. The author concludes that endogenous reinfection is responsible in most instances.

Bushnell considered that adult pulmonary tuberculosis was due to a second infection from within and this second infection spread from an original infection by virtue of accumulated toxic products together with the bacilli. Bacilli which filter through the lungs and pass to the tracheo-bronchial lymph nodes may die out, or hibernate, and it is conceivable that they may rekindle and develop into active pulmonary disease many years after the original infection.

Treatment

The author several years ago advocated postural rest, and, in bilateral apical and other lesions, the application of shot bags as adjuncts to the rest treatment in tuberculosis. Postural rest is based on the principle that the dependent lung of a patient lying on the side is placed at rest, aeration is decreased and the lung area is reduced. A small hair pillow placed under the chest decreases motion and makes the patient more comfortable.

In bilateral cases shot bags 5 inches square and weighing one to one and one-half pounds are placed on the chest with the patient lying flat on the back. Such a procedure limits the motion of the chest thus producing increased pulmonary rest.

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QUERIES AND ANSWERS



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EDITORIAL
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Q What are the routes of infection in tuberculosis?

A. Tubercle bacilli may enter the body with the inspired air, with food or with swallowed saliva. They may enter through the mucous membrane of either the respiratory or gastro-intestinal tract, through the skin, or through the tonsils.

The fact that most lesions are confined to the lungs has made the aerogenous route the more plausible to many, but those who believe in the ingestion theory point to the fact that bacilli which enter through the gastro-intestinal tract may be taken up with the chyle by the lymphatics which empty into the thoracic duct and be poured into the subclavian vein and carried on through the right heart into the pulmonary circulation. The first opportunity for bacilli which are absorbed with the chyle to be detained after being absorbed from the intestinal mucosa would be in the capillaries of the lung.

Q Am I correct in the assumption that pulmonary tuberculosis should not be treated by heliotherapy?

A. You are. Patients with active pulmonary tuberculosis should not be subjected to direct exposure to strong sunlight. Indirect diffused light is, of course, beneficial. Heliotherapy is indicated in childhood and extrapulmonary disease.

Q What are the most common sources of tuberculous infection and how may they be controlled?

A. The most common sources of infection are dried sputum, droplets which are thrown out by cough, bacillus contaminated articles of food, particularly milk, and clothing and wares of various kinds infected through handling. It is obvious that these sources are of such character that they may be eliminated by proper education and necessary laws. Indeed, infected milk is a rarity in urban districts due to laws requiring careful examinations of milk handlers, and tuberculin testing of cows. A more rigid enforcement of ordinances requiring examination of all food handlers, proper sterilization of dishes in restaurants, soda fountains, etc., and the ordinance prohibiting spitting in public places would materially cut down the incidence of tuberculous infection in a community.

The source of all infection is the tuberculous patient. If each patient is instructed in the proper methods of preventing a spread of his disease to his own household and friends, part of the battle of tuberculosis control is won. Isolation, precautions, disposal of sputum by burning, sterilization of the patient's dishes and utensils, etc., are essential in the control of infection.

Q How long should artificial pneumothorax collapse be carried on in a given patient?

A. It is impossible to judge accurately in advance just how long collapse must be maintained in any patient before he may be considered cured. Phthisiotherapists of wide experience teach that the lung should be kept collapsed for at least three years after symptoms have subsided. It

is obvious that the stage of the disease, the number and size of cavities, the patient's history, etc., should enter into the equation. It is impossible to tell when complete healing has been accomplished until the lung has been permitted to expand. Adverse symptoms during the period of re-expansion may indicate that a further period of collapse is necessary. X rays of the chest taken before the lung is completely re-expanded are helpful. Even with these precautions, however, it is difficult to be certain that there is no danger of a breakdown in the apparently healed lesion. Reexpansion of the lung necessarily means stretching and pulling of the scar tissue and may result in renewed disease.

Q Are pleural shock and gas embolism frequent complications of pneumothorax, and do they contraindicate further pneumothorax therapy in a given case?

A. Pleural shock is said to occur in about one in 500 pneumothorax treatments. One pleural shock incident does not preclude further treatment, but if the phenomenon is repeated in the same patient, pneumothorax therapy should be discontinued.

Gas or air embolism occurs about once in 500 to 1000 pneumothorax treatments. Unless there are other contraindications, this accident does not preclude further pneumothorax. There is an interesting abstract on this subject in this issue.

CASE, JAMES T. Tuberculosis of the Gall Bladder. *Annals of Int. Medicine*, Vol. 1, No. 7, p. 482.

Tuberculosis of the gall bladder is one of the rarest of pathological findings. The author was able to find only ten authentic cases, including his own reported case, proved by microscopical examination of the tissue. There are two forms of the disease, chronic ulcerative tuberculous cholecystitis and an acute milary tuberculous cholecystitis. Of the cases in the literature, eight were of the chronic type and two were milary, nine were in females and one in a male aged 57, five of the eight chronic cases were associated with cholelithiasis.

Tuberculosis of the gall-bladder has no clinical entity, and cannot be differentiated clinically from other forms of cholecystitis. Cholecystotomy should be performed in any case in which, at operation, a suspicion of gall bladder tuberculosis arises.

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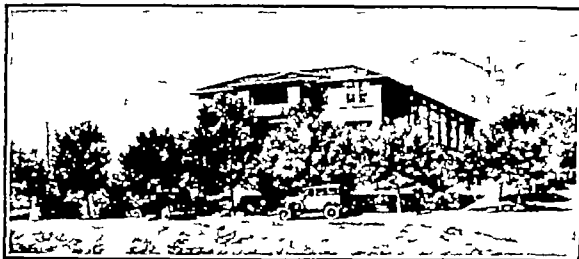
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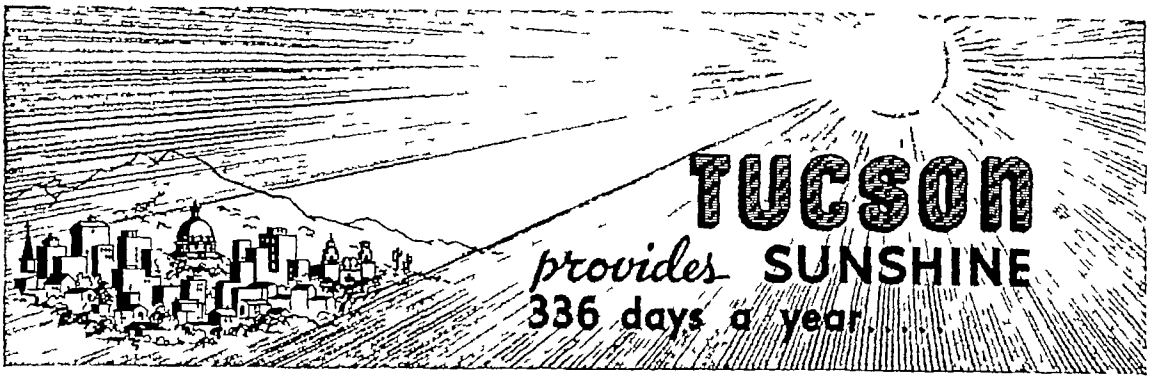
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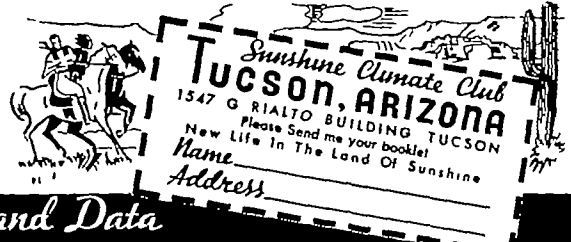
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	49.7	52.2	57.5	64.3	71.4	77.4	82.7	89.7	79.3	68.1	57.5	49.8	1157
RAINFALL (In inches—40-year average)	.8	.96	.81	.32	.14	.23	2.4	2.46	1.0	.6	.76	1.09	11.57
HUMIDITY Monthly (40-year average)	61	55.6	44.8	40.4	28.4	29.3	54.3	57.3	47.1	46.8	57.1	74.2	49.5
	35.3	27.7	22.4	22.6	15.9	17.7	36.7	35.7	29.0	26.5	41.1	48.1	29.9



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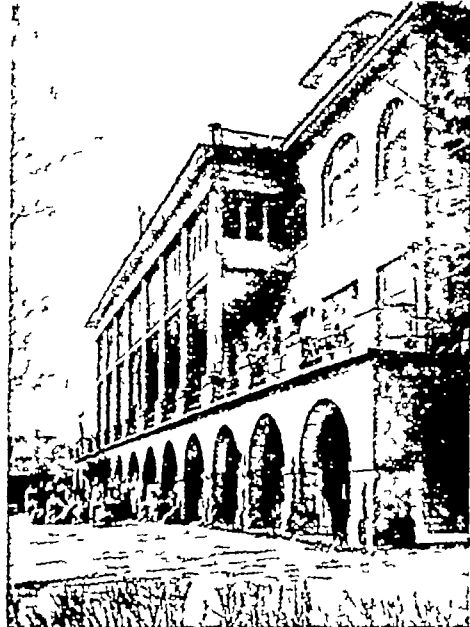
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When writing please mention DISEASES OF THE CHEST

erative in the enforcement of the law. As a result the examination has fallen into the province of the public health authorities, and the income therefrom has been lost to the private doctor. In many cities the examination has actually been abandoned because of the laxity with which the profession has carried on this work.

Compensation for this examination has apparently not been enough to interest the conscientious physician, or the physician has taken the fee and filled in the necessary blank after a half-hearted examination. A glance at the pharynx and a casual glance at the external genital organs have apparently been considered an examination which would reveal contagious or infectious disease. Venereal diseases are not transmitted in food.

This is a plea for careful examination of every food handler. If the examiner does nothing else he should take the necessary few minutes to carefully examine the worker's chest. Tuberculosis is one disease which can be spread from one person to another in food, or on utensils at restaurants, or soda fountains, etc. Obviously the discovery of active disease is the discovery of a possible source of infection. How many such sources have been allowed to dispense food to the unsuspecting public behind a lax food-handler's certificate is a problem for a mathematician. That such conditions can be prevented must certainly be obvious even to the laity.

The medical profession today has been criticized from many angles. It deplores such criticism, and it deplores its present status—that of being on the very verge of a change in the old order of things. May we be so bold as to suggest that the profession is responsible to a great extent for its present circumstances? May we further suggest that we have failed in one

respect in our attitude toward food-handlers' certificates? Laws are made to be enforced, and this is one law that the doctors were called upon to enforce. Let us give each food handler a thorough examination and fulfill our duty as the guardian of the people's health. R B H, JR

Educate the Patient IN TUBERCULOSIS there are no secrets to be kept from the patient. Frankness upon the part of the physician may shock the patient slightly at first, but it will be much appreciated as time goes on.

Usually the more knowledge the patient has concerning his condition, the more clearly he understands the reasons for carrying out the details of treatment which have been prescribed for him, the better he will co-operate with his physician and the quicker he will secure an arrestment of his trouble.

Education of the patient, therefore, is perhaps the most important and should be one of the first steps in the treatment. This may be brought about in two ways.

1. Send the patient to a good sanatorium even if he cannot afford to stay more than a month. Here he will learn a lot as a result of the routine which he is required to carry out, from the instructions and information imparted by the physicians at the sanatorium, and from association with other and more experienced patients in the institution.

2. See that he is supplied with authoritative and reliable literature concerning tuberculosis. There is now a great abundance of such literature available. A splendid assortment of books and reprints may be obtained from the National Tuberculosis Association, New York. One of the best of them is the concise booklet bearing the title of "What You Should Know About Tuberculosis." Of the books

which go more into detail concerning the disease, a most excellent one has recently been written by Dr Fied G Holmes of Phoenix, Arizona. Another is by Dr Lawrason Brown. There are numbers of others, all well worth reading, and any of them may be purchased through the National Association.

Other excellent reprints may be obtained from the Metropolitan Life Insurance Company of New York. This Company, by the way, should be held in the highest esteem by both the laity and the medical profession because of the excellent publicity which they have given in their advertisements to the facts concerning tuberculosis and other preventable diseases. Doubtless this publicity has had much to do with the reduction in the mortality rate of tuberculosis.

Another very commendable thing which the Metropolitan Life has done is the establishment of a large modern sanatorium for the care of its employees who develop tuberculosis.

Thus, by the way, puts its stamp of approval upon sanatorium treatment both as to the results obtained and to its economy in the end.

R B H

Heliotherapy THERE is a widespread belief among doctors, as well as the laity, that heliotherapy is not to be prescribed for patients with pulmonary tuberculosis, but that it is of great benefit to those who have the extrapulmonary form of the disease. In a way this tradition is fortunate, because it undoubtedly tends to prevent the tyro from doing an endless amount of harm. On the other hand, however, patients with pulmonary tuberculosis fail to receive the great benefit they may derive from heliotherapy, given at the proper time and in the proper dosage.

It is certainly well recognized that almost every patient with extrapulmonary tuberculosis has, in addition, a more or less marked pulmonary lesion. The ques-

tion naturally arises, why is it that cases with multiple tuberculous lesions, including those of the lungs, will respond favorably to heliotherapy, while those with pulmonary lesions alone cannot safely take the treatment? The answer, of course, is that they can, provided the physician understands the limitations and dangers of heliotherapy.

The above mentioned tradition has probably grown up because of the serious consequences often following over-dosage of natural or artificial light treatments. An over-dose may produce a reaction of a lesion localized in some bone or joint, but on account of the anatomical structure of the tissues harboring the lesion this reaction subsides usually without serious consequence. On the other hand, a pulmonary lesion, which is activated by over-dosage of light, often has no firm barrier to prevent the progress and extension of the activation, and grave consequences ensue. Not infrequently when an extra-pulmonary lesion develops, the pulmonary lesion shows a marked tendency to recession, and this may, in part, explain the fact that patients with extra-pulmonary tuberculosis frequently develop pulmonary exacerbations under heliotherapy treatment.

Granted that the above reasoning is true, it would certainly seem justifiable to use heliotherapy in properly selected cases of pulmonary tuberculosis. Such treatment is advisable, however, only when the patient is under close observation and in the hands of one thoroughly experienced in the use of light therapy. Almost invariably the patient has the feeling that if a little light does good, more will do better, and unless he is very closely observed he is extremely apt to resort to over-dosage.

It can safely be said that most patients with pulmonary tuberculosis, if they reach a stage where the lesion is healing and where they are free from active symptoms of toxemia, can be given heliotherapy with marked benefit.

A M F

An Operation For Tuberculous Empyema*

THE ORDINARY form of rib resection with introduction of a drainage tube is notoriously unsatisfactory in tuberculous empyema, especially in empyemas the pus of which contains either tubercle bacilli alone or no demonstrable organism at all, i.e., empyemas not secondarily infected. So called "closed" drainage, drainage by means of a tube introduced into an intercostal space through a trocar, is equally bad. Both of these methods always lead to secondary infection and almost always to fever, sepsis, and death.

Some forms of tuberculous empyema, however, occasionally purely tuberculous ones, more often secondarily infected ones, produce such consistently high swinging temperatures and such severe symptoms of toxicity, that surgeons are impelled again and again to drain in spite of previous warnings and in spite of full knowledge of the trouble that usually ensues.

Several methods of treatment are proposed for such toxic tuberculous empyemas. Aspiration with a syringe, replacement of the pus by an equal quantity of air, and irrigation of the pyopneumothorax cavity with countless varieties of antiseptic solutions have been recommended. Aspiration often results in abatement of fever and sepsis for a few days and even weeks, but usually needs be repeated so often and so long that both the doctor's and the sufferer's patience is exhausted. At times it leads to cure, usually not.

Oleo thorax (injection of gomenol and various other antiseptic or aseptic oils) has led to good results in some hands (Matson), to disastrous results in others.

Extensive thoracoplasty may succeed in obliterating the empyema cavity, but the

BY
L. ELOESSER, M.D., F.A.C.S.†
San Francisco, California

operation needs be extensive and formidable. It entails considerable risk to patients weakened by long toxicity and considerable crippling at best.

Cure of these tuberculous empyemas is made difficult by the tenacity with which the underlying lung resists expansion. It is also made difficult by the unfavorable effect of an inlying drainage tube of any kind. The presence of the tube itself, I think, tends to keep up fever and sepsis. Some tuberculous empyemas treated ill advisedly by rib resection and drainage heal if one does nothing more than remove the drainage tube.

A desire to obviate a drainage tube led to an operation which has proved of use in a number of secondarily infected tuber-

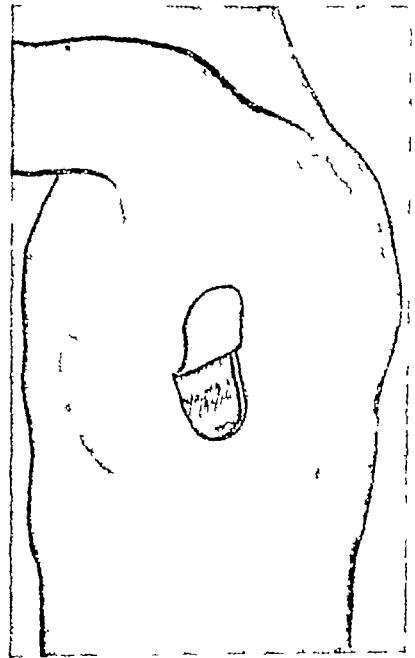


Fig 1 Flap of skin outlined

culous empyemas. Encouraged by its success it has with some hesitancy recently been used in a few obstinately toxic tuberculous empyemas, in which no pus-forming organisms could be found.

The operation causes the underlying lung to expand, it is, therefore, *not ap-*

*Reprint from *Surgery, Gynecology and Obstetrics*, June 1935, Vol. 60, 1096-1097.

†From the Stanford Surgical Service of the San Francisco Hospital Department of Public Health.

plicable to those empyemas in which the lung is so badly affected that expansion to any degree seems inadvisable. The question of applicability must be decided

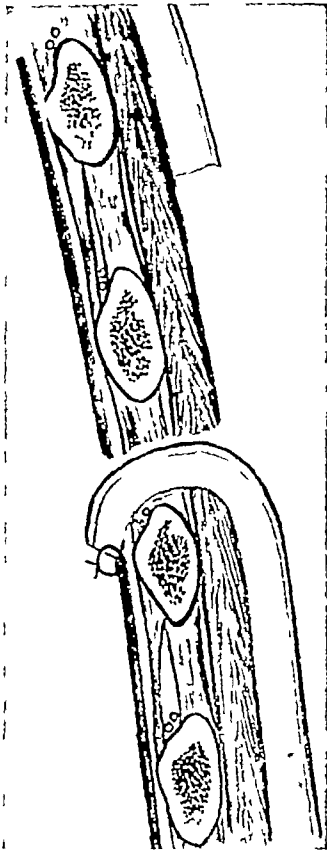


Fig 2 Cross section of chest wall showing skin flap turned into chest and attached to pleura

by clinical pulmonary symptoms and especially by X-rays taken prior to the appearance of the complicating empyema. If cough and expectoration of bacillus bearing sputum still persist and if early roentgenograms reveal large cavities or other extensive parenchymal damage, some form of thoracoplasty is probably safer. Fortunately, in many empyemas the lung seems little if at all affected and partial if not total expansion seems allowable. If but partial expansion seems advisable the operation to be described should be complemented by an upper thoracoplasty.

Technique

Under local anaesthesia a U-shaped flap of skin and subcutis is outlined about half way between the posterior axillary line and the line of the inferior scapular angle

The flap has a base about 2 inches wide which lies about one rib higher than the bottom of the empyema cavity, so that the rising diaphragm may not stop drainage, it is about $2\frac{1}{2}$ inches long, the length of two ribs and their intercostal spaces, long enough to reach into the pleural cavity without the least tension and longer, therefore, in fat patients than in lean ones. The rib underlying the top of the flap is resected, the amount resected equalling the width of the flap. If the flap is too narrow and the resection too scant, drainage will be insufficient. It is good, I think, to strip the rib with a cautery instead of a raspatory and to inject the bared intercostal nerve with 1 cubic centimeter of absolute alcohol. The tip of this flap is turned into the chest and tacked to the pleura with one or two chromic catgut stitches, the edges of the defect in the skin are approximated with a few stitches of silkworm.

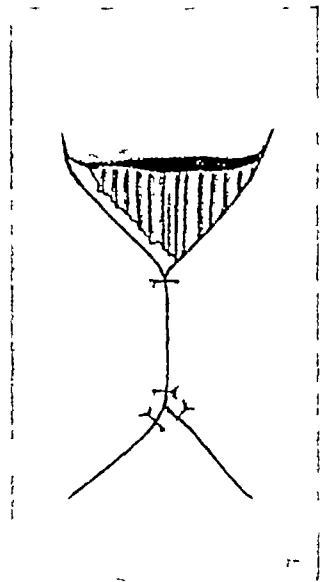


Fig 3 Skin flap turned into chest cavity, edges of defect approximated by sutures

This thoracotomy needs no tube, for the skin flap which lies against the soft parts of the chest keeps the wound open. It remains open until the lung reaches the chest wall, after which it spontaneously and automatically closes without further aid. It has a valve action, each cough or rise in intrapulmonary air pressure expels

(Continued to page 23)

The Cause of Tuberculosis

SINCE REMOTE ANTIQUITY tuberculosis has been taking its annual toll of human life. Many of the

Egyptian mummies of 3,000 years ago show signs of bone tuberculosis. Since that early time this dread disease has received many names and has been laid to many causes. The Greeks called it "phthisis," meaning "wasting." Tuberculosis of the lungs has long been known as "consumption." Both of these names are entirely proper. Tuberculosis in all its forms is frequently spoken of as "the great white plague" or the "captain of the men of death." Since ancient times a few physicians have believed tuberculosis to be a contagious disease. The accuracy of this contention was verified in 1864 when J. A. Villemin demonstrated experimentally that the disease can be transmitted from one animal to another, and from human beings to animals by inoculation of the sputum brought up by tuberculous patients. It was not till 1882, however, that Robert Koch discovered the real cause of tuberculosis and proved it to be a specific kind of bacteria, the tubercle bacillus.

There are three types of tubercle bacilli which produce disease: (1) the human, which causes most of the tuberculosis in man, (2) the bovine type, which attacks cattle but which can also infect human beings, and (3) the avian, which is the usual type in birds. Tuberculosis of the bovine type of germ has now largely been eliminated by close inspection and testing of milch cows, and the avian type of germ seldom, if ever, attacks man. It is, therefore, the human type of tubercle bacilli which produces practically all cases of tuberculosis in man. Tubercle bacilli are very small, rod-shaped organisms which die if exposed for several hours to sunlight and fresh air. They are very resistant to drying and freezing, however, and can live a long time in poorly lighted and poorly ventilated surroundings. Tubercle bacilli enter the body on minute particles

BY

A. R. MASTEN, M. D.

Wheatridge, Colorado

of dust, or on the tiny driplets of sputum emitted during a cough. It is from the sputum of some

person with active tuberculosis that other persons become infected. It has been said, and rightly so, that if all persons sick with tuberculosis could be so carefully isolated that none of their germ-containing sputum would be carried to other people the disease would be eradicated in one generation. That is to say, every case of tuberculosis comes from another case of tuberculosis, it never originates spontaneously, and no other disease ever turns into it.

Tuberculosis was formerly thought to be hereditary, that is, the child of tuberculous parents was born with the disease or at least was born with a tendency to develop tuberculosis, a tuberculous diathesis, as it was called. This idea has now been proved to be a fallacy, for on thorough study it has been shown that children are practically never born with the disease, but instead acquire it after birth by receiving tubercle bacilli from their parents. Instead of inheriting a tuberculous diathesis, many investigators now believe quite the contrary, namely, that children of tuberculous parents inherit more resistance to the disease than other children. The reason tuberculosis runs in certain families is that in close family association it is easy to spread the germs from one member to another.

In civilized communities the contact between individuals is so close that sooner or later practically every person becomes infected with tuberculosis. This does not mean that every one acquires the disease, but only that some tubercle bacilli gain a foothold in their bodies. This first infection with tubercle bacilli is usually overcome without the person's knowing anything about it. Active disease occurs later when the person becomes debilitated, run-down, or else acquires a new infection with tubercle bacilli. This secondary in-

fection is the one that produces active tuberculosis, the disease known as consumption. It is this reinfection type of disease which produces so much disability and death. In the United States the incidence of tuberculous infection has diminished markedly in the last few years. In a study of children in Minnesota, Myers found a decrease of almost fifty percent between the years 1921 and 1933. Myers maintains that in many parts of the United States 90% of the boys and girls reach the teen age without being infected with tubercle bacilli. This is a vast improvement from the former condition when it was said that 95% of all children became infected before reaching thirteen. Myers also proved that of the children who react positively to tuberculin some ten percent will fall ill from clinical tuberculosis by the time they reach the age of 21 years, while only some 2% of the non-reactors will become ill with clinical tuberculosis. Formerly, it was believed that all tuberculosis was contracted in early childhood, but recent investigations, such as the one mentioned above in Minnesota, have shown that tuberculosis can be acquired at any age, and that both children and adults react in the same way to a first infection.

There are several possibilities inherent in the first infection which determine its eventual effect on the individual. (1) A person may receive a very small number of germs from a chance contact with someone having active tuberculosis, and thereafter receive no more germs for a long period of time. In this instance, the germs invariably produce a very slight disease process which tends to resolve and calcify (heal permanently). In this case the individual will probably go through life without any further trouble. In other words, a slight infection will produce enough immunity to protect the individual from the usual infections received during everyday life. This is what happens to the great majority of people. (2) A person may receive a somewhat larger number of germs at rather infrequent intervals, as might occur when some member of his family has a chronic case of tuberculosis and dis-

charges germs only when he has a cold or otherwise becomes run-down. In this instance the disease process is usually more extensive than in the first class and it heals only partially, leaving a constant focus of disease. This focus may later undergo reactivation, because of a breaking down of the healing process, caused by lowered vitality of the individual. In this case the person becomes sick, because of a reactivation and spread of the germs which are already in his body. Most cases of active tuberculosis are thought to be of this type. Even in this type of infection active disease does not always result, for in perhaps the vast majority of people occurrences do not transpire which result in a marked lowering of their vitality, and they go through life without ever acquiring active consumption. (3) A person may receive a great number of germs at one time, a massive infection. In this instance the first infection is often severe and may progress steadily into the reinfection type of disease. This same result is obtained when a person receives small infections continuously, as when he is in close contact with someone having active tuberculosis who does not take great care to prevent his germ-containing sputum being transferred to all his associates. (4) A person may receive a small infection which heals completely as in class (1) and at some later date receive a massive or overwhelming reinfection from some outside source. In such a case the immunity obtained from the first infection is overcome and the individual develops active tuberculosis. Some investigators believe that this is the way most active cases of tuberculosis develop. They maintain that the primary infection completely heals in the vast majority of cases and that active consumption is the result of a reinfection from some exogenous (outside) source. That is to say, consumption is not generally the result of a lighting up of an old infection received in childhood.

The extent of the tuberculous process which results from any given infection is not controlled solely by the number of

(Continued to page 23)

Gastro-Enterology and Pulmonary Tuberculosis

IT IS NOT the purpose of this discussion to set forth the more technical phases of the gastro-enterological

BY
JAMES J GORMAN, M D
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picture of pulmonary tuberculosis which can be found by reference to the proper articles, but rather to present the more pertinent clinical and laboratory facts as encountered by the gastro-enterologist in his daily practice

It is to be regretted that such a vital function as the digestion seems to rate such a comparatively small percentage of attention in proportion to that accorded the respiratory tract when tuberculosis is present. On the other hand, let me sound a note of warning that the reverse responsibility rests on the gastro-enterologist in that vague gastro-intestinal symptoms not explained by other causes must not be permitted to continue without excluding the possibility of pulmonary tuberculosis.

Cases with gastro-intestinal symptoms as the earlier manifestation of pulmonary tuberculosis are not uncommon and it is to the discredit of the examiner in his original examination if he has not made a thorough examination of his patient to exclude this possibility. It is this type of case, however, that presents the greatest difficulty in diagnosis. The pulmonary lesion is usually early, capable of escaping detection by the stethoscope, or showing only moderate changes in the quality of the breath sounds. There is nothing characteristic in the gastro-intestinal picture. Vague symptoms of gastric discomfort, loss of appetite, a desire to eat but when attempted a feeling of nausea, a revolting feeling toward further ingestion of food, gas possibly present after only a few bites of food are taken, irregular distention, and varying constipation are frequent symptoms encountered. There is no specific reference of the above symptoms to pulmonary tuberculosis, but add to these symptoms exhaustion on rising, a contin-

ued sense of fatigue, an unexplainable loss of weight, and secondary anemia, and even though the pulmonary

history fails to disclose any positive symptoms we have just cause for growing suspicious of any doubtful pulmonary findings. If further observation of the patient fails to record the expected improvement, the patient should have the advantage of an examination by our consulting Pulmonary Specialist or, where this is not possible, an X-Ray examination. There is scarcely a community so small or so isolated today that recourse can not be had to the X-Ray and, if so desired, a consulting Roentgenologist can be easily consulted by forwarding him the plates if necessary. Too often these cases are permitted to escape the critical eye because the temperature and pulse are normal or, not infrequently, subnormal. One such case presented itself for gastro-intestinal examination requesting that the lungs not be examined because they had been examined within six weeks by the fluoroscope and said to be normal. Our physical examination revealed only very questionably suspicious findings, but X-Ray examination showed early pulmonary tuberculosis. This patient was able to end an invalidism of two years under the care of the Chest Consultant in a very short length of time. Another patient gave a history of gastro-intestinal symptoms for two years with a history of negative chest findings one year prior to our examination, but having moderately advanced bilateral involvement easily recognizable on physical examination at the time of our observation, having unfortunately been treated during the intervening period under the false illusion of nervous indigestion. Another presented the symptoms enumerated above with negative pulmonary history but showed minimal pulmonary findings. This patient when placed under treatment aimed at the

pulmonary condition, with but slight regulation of the gastro-intestinal condition, gained twenty pounds in three months. And still another under observation considered to have a chronic healed pulmonary lesion referred to me by Chest Specialist was allowed to continue under observation for six weeks while showing poor response to treatment, this being attributed to the presence of chronic appendicitis. He was again adjudged inactive on examination by Chest Specialist only to show active lesion on X-Ray.

Be it noted that these patients had normal temperature at four hour checks throughout the day and pulse rate, while active, between sixty and seventy-six.

We may reverse the picture and place somewhat similar symptoms, but add to them marked distention occurring after meals, as the picture frequently seen by the gastro-enterologist in consultation after early pulmonary treatment has been instituted. Is it not strange that in pulmonary tuberculosis, when treatment dictates that the body be put at rest, the mind placed as nearly at rest as possible, that the gastro-intestinal tract is called on to do 100 percent, yea, often times 400 percent more work than it has ever been called on to do before? This, in spite of the fact that its master is under complete rest and that it is absorbing toxins from the existing infection. It is to shudder at some of the sentences imposed on this poor, harmless, unsuspecting organ of digestion when one consults his files to find a history of the previous judge imposing a sentence of two quarts of orange juice and a gallon of milk daily for six weeks, or that of untold cream, or again, that old method of eating all you can and when you can't hold any more, drinking a quart of milk. Is it any wonder that our files are topheavy with cases showing the development of gastric symptoms four to six months after undergoing treatment for their pulmonary lesion? Is it any wonder that the gastric secretory and motor functions frequently affected by inactivity of the patient and toxic absorption revolt under such a regime? Is it any wonder that

sensitization built on the background of over-ingestion of particular foods enters the picture to further harass our unsuspecting victim? Is it any wonder that a poor colon forced to undergo such an extra load not infrequently walks the path of spasticity or atonicity?

It is to the credit of the chest specialist of today that such a fundamentally important function as that of digestion is so clearly recognized and appreciated and that in the armamentarium of the modern sanatorium is found the dietician and the consulting gastro-enterologist.

Let us not be so impressed by the usual and more common disorders of low secretory and motor activity as to disregard a most careful history, which may reveal other disturbances in the secretory and motor mechanism, gall bladder infections, allergic manifestations, catarrhal conditions, nervous indigestion, irritable duodenum, or irritable colon. Bloating is a symptom that frequently presents itself, and though classically occurring in connection with hyper-acidity, may, when proper analysis of other symptoms are made, be found to be due to depressed secretion probably associated with gastric retention or allergy. Unfortunately it is not always feasible or good judgment to resort to gastric analysis for information and clinical symptoms must be studied carefully.

Drugs for relief of the general condition, toxemia, or to allay the cough are a necessary nuisance to the gastro-enterologist. Anti-pyretics, codein and similar drugs leave their trail of gastric and intestinal disorders. But we must accept them and meet the situation as best indicated.

Cathartics, the bane of every gastro-enterologist's existence, crowd their victims to the front in ever-increasing numbers in the tubercular. Taken from an active life, put at rest, and most likely under forced feeding, constipation frequently ensues. Increasing doses of cathartics with history of having to use stronger and stronger medicines not infrequently results in a spastic or, perhaps more unfortunately, a mucous colitis.

And then we are confronted with the gross pathological lesions of gastro-intestinal tuberculosis. Involvement of the stomach is so rare we may readily ignore it. Involvement is centered chiefly around the cecum, terminal ileum, and colon. Again we are confronted with conditions not manifesting a clear-cut clinical picture. Dr. Emil Granet recently reporting on 2,086 cases, impresses us again with the relatively high percentage of cases, 71 per cent in his series, showing X-Ray manifestations of intestinal tuberculosis with an absence of clinical symptoms. Is this not the answer to the question regarding the difficulty of making a diagnosis in intestinal tuberculosis? Is this not a hint to the examiner, granting a given case showing low grade temperature, anorexia, loss of weight not explained by the existing lung condition, to investigate the gastro-intestinal tract even in the face of negative symptoms? And, to give credit to the chest specialist, it may be said that just such investigations have been requested for a considerable length of time.

There is nothing more characteristic than the foul, gray, granular stool containing pus and blood and a diagnosis of tuberculous enteritis is assured, but too late to be of benefit. Through the aid of Brown and Sampson we have for many years been enabled to make our diagnosis at an early date by use of the X-Ray. References to their work on this subject may be readily made. Since the diagnosis depends on visualization of localized spasm, I feel that the fluoroscopic examination should not be relied upon entirely, for in many questionable cases details which can only be observed by plating may be overlooked. The day may not be far distant for the ideal to be realized—a routine gastro-intestinal X-Ray examination for every tuberculous patient regardless of gastro-intestinal symptoms.

Clinical symptoms, unfortunately, are variable. Constipation rather than diarrhea is a frequent early symptom. Vague cramping sensations to sharp pains with variable relationship to meals are frequent symptoms. Gas and distention may or

may not be prominent symptoms and in an early case frequently insignificant. Fullness, vague discomfort, and burning over the right lower quadrant are frequently complained of. Nausea, frequently a troublesome symptom, is most often encountered in cases with severe toxemia. Other symptoms less frequently encountered may be elicited from a careful history.

Physical examination may fail to reveal positive findings, but frequently reveals slight to marked generalized tenderness. In tuberculosis of the cecum tenseness over the right lower quadrant may be present. Dull tympany is not infrequently present.

Tuberculous appendicitis and tuberculous peritonitis should always be considered in the differential diagnosis of a given case.

It is not in the scope of this discussion to be able to set forth all of the principles involved in the surgical consideration of pulmonary tuberculosis or of surgery of the tuberculous intestine. Let it suffice to say that since intestinal tuberculosis is so dependent for its progress on the progress of the chest condition that the mere presence of involvement of the intestine is not in itself a contra-indication for chest surgery. Often chest surgery is the means of curing the intestinal lesion. Many factors are to be considered. Careful clinical and X-Ray study of the gastro-intestinal tract should be made before permission for surgical procedure is granted. One other general principle is that operation for appendicitis should hold no fear in itself and should not be too long delayed, but should if possible be absolutely avoided in the face of tuberculous activity of the cecum.

As to treatment—treat the existing gastro-intestinal condition, but in addition, modify this to meet the requirements as indicated by the condition of the patient as a whole. Absolute cooperation between the Chest Attendant and the Gastro-Enterologist is essential. It is my practice to submit my anticipated course of treatment

(Continued to page 24)

Necropsies in Tuberculosis

PULMONARY tuberculosis constitutes one of the commonest and best known causes of death. With the aid of the X-ray and the microscopic examination of the sputum, the diagnosis may be made with considerable assurance in a very high proportion of all cases of death from this disease. Physicians are therefore often reluctant to request permission for necropsy examinations in instances where advanced tuberculosis has been recognized, and relatives are apt to manifest surprise when it is suggested.

Nevertheless, a post-mortem examination in all instances of death ascribed to tuberculosis should be sought in all seriousness. There are many reasons for emphasizing this procedure. Only too often, afterwards, the physician is reproached for having neglected it. The relatives may well have economic as well as sentimental reasons for wishing the actual cause of death and the complicating factors determined. The physician may have much to learn about his own diagnostic acumen and therapeutic adequacy from the examination of the patients whom he has treated. And patients later to be treated by a physician may well profit from things which he has learned through previous necropsies.

Only too often the fact that a patient has had tuberculosis is assumed as sufficient evidence that this is the cause of death, forgetting the fact that phthisics are just as apt as others to fall victim to homicide, suicide, and accidental death, as well as to most of the other illnesses to which man is heir. Even in the cases where other pulmonary pathology, as coccidioides, cancer of the lung, mycotic infections, etc., may be ruled out, the existence of tuberculosis in the lungs, even in an advanced stage, is not necessarily the cause of death. A study of several hundred necropsies performed at the Olive View Sanatorium, where none but tuberculosis patients are supposed to be admit-

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ted, showed that more than ten percent of the patients examined did not have active tuberculosis at the time

of death, and another ten percent died of non-tuberculous conditions associated with their pulmonary disease.

Even in instances where the acid-fast bacillus is the cause of the death, the determination of the mechanism or manner in which it acts may be of great importance. Thus, it was found at Olive View that deaths were more apt to occur from complications, intestinal, laryngeal, or pleural, than from the pulmonary lesion itself. The recognition of the importance of such complications is emphasized by necropsy examinations and proves of value to the physician in caring for subsequent patients.

It is not enough, today, merely to know that the lungs are infected by the acid-fast bacillus, but the type of infection, the tendency to exudative or proliferative reactions, the mode of spread and the mechanical factors determining spread and interfering with healing must be considered. The comparison of the clinical and radiographic findings with post-mortem observations is the most important means for improving our knowledge of the pathogenesis and course of the white plague, and is a valuable step in its control.

THE PUBLIC SCHOOLS of our nation have again opened their doors this month. Among the hundreds attending these schools, both city and rural, there are many cases of juvenile tuberculosis. It is generally believed and taught today that most adult cases of the disease result from infection gained during childhood. For this reason the subject of tuberculosis should be taught in each school, as there is no other single subject more important to the school child's present and future health.

C M H

The Handling of the Acute Asthmatic Paroxysm

THE DISTRESS of the patient in an asthmatic paroxysm obviously calls for at least immediate temporary relief. Ordinarily, except possibly in an initial attack, home remedies, such as various inhalants, local chest applications and "smokes," have been tried, and their inefficacy on that particular occasion is the reason for the summoning of medical aid. Such agents as these various nitre smokes, etc., will give relief only in mild attacks, being valueless in paroxysms of any degree of severity, and would hardly be prescribed by a trained physician with decidedly more efficacious remedies available.

The first drug offering enough of a possibility of relief to be worthy of consideration is ephedrine. This is marketed in the form of three-eighths grain and three-fourths grain tablets or capsules of the sulphate or hydrochloride, and as a syrup or elixir containing one-eighth grain to the diachm. It has been the general expression of allergy workers and patients who have used ephedrine, that the three-eighths grain dose will give as much relief as the three-fourths grain, and obviate much of the unpleasant symptomatology frequently accompanying the larger dosage—nervousness, sweating, sleeplessness and, at times, nausea and vomiting. The same symptoms often accompany even the three-eighths grain dose, especially if repeated, and many patients, at least fifty per cent of mine, will not continue with its further use. Except in severe asthmatic paroxysms, its employment subcutaneously is uncalled for, and it is so far inferior to epinephrine in efficacy that its exhibition in such manner is ordinarily superfluous. Given by mouth, it has some value in the milder attacks, especially in children. It is also at times of some help in reducing the epinephrine dosages required to control frequently recurring

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daily asthmatic attacks. The nervous manifestations of this drug can be considerably abated by combining it with small doses of the common hypnotics.

Also, for many years chronic asthmatics have known of the relief obtainable by the use of proprietary nasal sprays, especially those containing cocaine. The therapeutic action is probably secured by the shrinkage of the vasomotor rhinitis mucosa so often accompanying the asthmatic paroxysm, and the deadening to some extent of the reception of nasal sensory stimuli that would incite the reflex bronchial spasm. While practically there is very little possibility of cocaine addiction to be invited by such usage, such possibility is at least potential. Also, a certain percentage of asthmatics are very sensitive to cocaine, novocaine and allied products, and unpleasant reactions can occur. Often identical helpful results can be secured by the employment of a one per cent ephedrine nasal spray, and while sensitivity to ephedrine is not unknown, only very few cases have been reported, and its use as a nose spray is certainly very gratifying in stopping mild asthma or asthmatoïd bronchitis, especially in children, and in my practice is almost routine until proper permanent measures can be instituted for the control of nasal turgescence.

Atropine, belladonna, iodides, calcium and glucose given by mouth, hypodermatically or intravenously, while of some value in isolated cases, have, in the hands of most allergy workers, proven, on the whole, inefficacious.

This brings us up now to epinephrine, undoubtedly the most reliable remedy for immediate asthma relief yet discovered, and a real boon to suffering allergic humanity. Given hypodermatically in proper dosage (the average dose is 0.5 cc), relief comes within a few moments, and if not complete, usually becomes so with

a repetition of such dosage at the end of twenty minutes to one-half hour. Fortunately, this remedy so employed, and repeated if necessary in this manner every few hours, will, in the vast majority of instances, give the desired relief. The case is then ready for the ordinary standard methods of etiological diagnosis and treatment to prevent recurrences.

Now, unfortunately there exists a percentage of asthmatics in whom, on account of unusual attack severity, no such relief whatsoever is secured by repeated epinephrine doses or in whom such relief is partial and transient, and such frequent repetitions of the drug in large dosages are required that its further use becomes either intolerable or unavailing. Under these, and these circumstances only, is our next standby, morphia, necessary or justifiable, not only from the possibility of inviting addiction, but also because many asthmatics are actually and decidedly sensitive to any or all opium derivatives, showing this sensitivity in subsequent intense nausea and vomiting, and following temporary relief, recurrence of the asthma. For this reason, at least fifty per cent of my patients rebel against its use, and will accept it only as a last resource. However, under the conditions mentioned, occasionally its use is absolutely necessary.

Now let us presume that both epinephrine and morphia in frequent and rather massive dosages have given no, or only partial temporary, relief, and that the patient is in a constant or almost constant severe status asthmaticus, which, if not broken by some means or other, may in a few hours or in a day or two terminate in death from exhaustion. There is scarcely in the catalog of human suffering any picture more pitiful than one of these sick asthma cases in this condition, and scarcely one in any other ailment in a more critical state, as death is far from unknown in these patients. It must be remembered that at this stage some of these cases are unconscious and almost pulseless, and the unconsciousness is not by any means invariably due to morphine over-

dosage, though, of course, this must be taken into consideration. The amount of pupillary contraction is a guide.

For such desperate conditions, four surgical methods have been suggested.

1 Cervical sympathectomy. I have seen one case, a failure, afterwards relieved with no great difficulty by usual conservative asthma treatment. This operation has been discarded.

2 Alcoholic blockage or section of the dorsal sympathetics. This operation has given temporary relief, but is scarcely yet to be accepted as safe or a standard measure on account of the limited number of cases reported in the literature.

3 Bronchoscopy. A number of cases have been temporarily relieved by this line of treatment.

4 Immediate surgical operative work on paranasal sinuses. Which cases of asthma will require ultimate surgical handling of the paranasal sinuses to secure permanent relief is not the purpose of this article. The cases I am discussing are in such condition that any surgical interference for the time being, except possibly dorsal sympathectomy, would not be tolerated.

As far as I can express an opinion, all these measures are superfluous as it is probably over five years since I have been unable to give relief to this condition with a case of this type to handle every few weeks.

Also, the not infrequent, at least temporary, abeyance of asthma attacks during pregnancy, some non-related surgical operation or an intercurrent non-respiratory tract infection accompanied by a period of high bodily temperature elevation, has led to efforts to secure such relief by the production of high temperatures artificially. This has been done most often either by subcutaneous or intravenous injections of peptone, milk, typhoid vaccine, and more recently by diathermy. Results have been inconsistent and unsatisfactory.

What then can be done?

In order at this state to secure any results whatsoever, there must exist a little knowledge and consideration of the physio-pathological processes at work. There

are three possibilities. First, there has been such a massive and continuous over-dosage of specific and non-specific antigenic stimuli that the ordinary defensive immunological mechanisms of the individual involved against such stimuli have been completely overwhelmed for the time being. Or secondly, the sympathetic nervous system controlling bronchial spasm is in such an exquisite state of hypersensitivity that minor stimuli that would probably be of no effect, maintain the spasm with a vigor that our ordinary antispasmodic agencies will not control. Possibly both factors are at work, but fortunately can be handled by identical measures. Thirdly, there is always the additional possibility of spasm maintenance by the physical efforts due to ineffective coughing efforts to expel heavy, viscid mucus, and casts, which actually threatened to induce partial atelectasis and suffocation, a condition not rarely seen post mortem in deaths from bronchial asthma. In my hands so far, handling the first two possibilities has ultimately taken care of this contingency.

Naturally the handling of such a case calls for the elimination of practically all known specific or non-specific antigens or stimuli that will induce or maintain the asthma paroxysm. A private hospital room (not a ward bed) maintained at an even comfortable temperature is almost essential. Such a room is then made, and meticulously kept, antigen free. Pollen and ordinary outside atmospheric dusts are taken care of by suitable filters or excluded by closed and tightly sealed windows. House dusts, such as those derived from feathers, wool lint or fuzz, animal hair, furs, cosmetics, insecticides, must be taken care of, and also smoke and odors of all kinds.

Often only by the perfect or near perfect elimination of such stimuli is there the slightest possibility of recovery. The slightest physical exertion in these cases is usually impossible without producing or increasing the asthma, and its trial must be absolutely forbidden. Fortunately, there are no dietary worries at this time

as these cases cannot take nourishment or even water. Special nursing care is absolutely essential.

Once this environment has been accomplished, a return to epinephrine and morphia, given frequently under careful supervision, will usually after several hours of within a day or two now break the asthmatic status, where they had previously proven unavailing. However, even under such ideal conditions, not a particle relief may come. In such a desperate situation with wild spasms persisting, the patient only partially conscious, pale, trembling and almost pulseless, with a terminal exhaustion about to supervene, and pin point pupils forbidding further morphia, the proposition seems, but rarely is, hopeless. Fortunately, there are other measures available, one of which, if repeated sufficiently frequently will in the end break the spasm.

First comes epinephrine given slowly intravenously in from two to four minim doses every ten, twenty minutes or half hour. The employment of the 1:10,000 dilution in this connection is as efficacious as the use of the usual stronger 1:1,000 dilution, and avoids the decidedly uncomfortable epinephrine symptoms of headache, tremor, pallor and vomiting. Relief usually ensues. It is remarkable how promptly and completely such small intravenous doses give relief after massive 1 c.c. doses every fifteen minutes or half hour subcutaneously have completely failed. There exists the possibility that with the retarded circulation seen in these cases with weak, thready pulse, the subcutaneously administered epinephrine is absorbed from the tissues so slowly that partial or complete digestion or chemical alteration occurs, causing the loss of most or all of the antispasmodic radicals.

Direct inhalation anaesthesia by ether, chloroform and carbon dioxide for this status asthmaticus has been reported as giving some results, but literature reports and my personal experience are too meager to pass any opinion. If any general anaesthetic is to be tried in these cases to relax spasm, a warning should be given regard-

ing the choice of sodium amytal to be used intravenously. Theoretically under these circumstances, the drug would seem indicated, but two deaths have been reported from its use in asthma, and I have had one case decidedly too close to an immediate fatality to be comfortable. Anaesthesia produced by ether and olive oil given by rectum, as originated by Maytum of the Mayo Clinic (1), has worked gorgeously for me in some instances and failed dismally in others. This procedure can be repeated in a few hours if necessary, and can be used coincidentally with the intravenous epinephrine with happiest outcome.

When the extreme status asthmaticus has been broken in these patients, one is not through with them by any means. Even under the most meticulous observation and elimination of all known asthma antigenic stimuli, the usual story of these cases even in antigen free rooms is a gradual reduction of the relief measures employed. Epinephrine in reduced doses may be required for several days, gradually dropping to two or three doses a day from the eighteen or twenty doses required at the inception of treatment, and a single nocturnal dose may be required for weeks. For some time these cases may be in such a state of extreme hypersensitivity that the slightest infraction of antigenic precautions results in severe relapses.

When these cases are able to take nourishment, the dietary precautions should consist in the avoidance of all foods known to have antigenic properties, lists of which are easily available. Drugs also fit into this category.

Many of these cases will now show a blood eosinophilia previously absent.

A word of warning should be given regarding testing these sick cases with our usual methods. These tests should not be attempted until these patients are practically ambulant convalescents at least and epinephrine reduced to a minimum. If we regard the positive skin reaction as indicative of some measure of immunological re-

sponse, as we regard the positive tuberculin test in tuberculosis, then precisely as happens with the employment of the latter agent in advanced tuberculosis, the tests are not only practically invariably negative, but each represents a potential antigen dosage that might induce a severe protracted relapse. This is especially true if pollen material is used. This statement is made as a result of some bitter personal experiences after too early or too strong testing. Inasmuch as all known causes of asthma are being taken care of in these cases, there exists no necessity for immediate testing as far as immediate relief is concerned. Often the history of a case will admit the possibility of accurate enough diagnoses to admit specific treatment inception before any positive tests can be secured, and often this will be necessary, as weeks or months may be required before tests will become positive in these cases. Such initial specific treatment naturally must start with an almost infinitesimal dilution and be proceeded with very cautiously as there will be no local aim reactions to warn of the approach of such overdosage and subsequent relapse.

Living under a total, or nearly total, antigen free environment will ultimately clear these chronic severe cases, it might be said, practically without exception, though, unfortunately many weeks or months, or even in extreme instances a year or longer, may be required. But the results are worth the time invested, and if tuberculosis cases can give months to sanatorium residence to regain health, there is no reason why a similar period of time cannot be given by a severe chronic asthmatic invalid. Ultimately by persistent intelligent care and appropriate desensitization methods, a high degree of permanent relief and economic recovery should be secured with this severe type as well as the usual milder types of bronchial asthma.

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Treatment of Intestinal Tuberculosis

With Especial Reference to Oxyperitoneum

DURING THE PAST two decades our conception of the etiology, diagnosis and treatment of intestinal tu-

berculosis has changed considerably. Our present knowledge indicates that, for practical purposes, etiologically, it is secondary to active pulmonary tuberculosis of the ulcerative type. Illustrative of this opinion, Boles and his associates in 226 autopsies of patients with tuberculosis of the lungs concluded that where there were no pulmonary ulcerations there were no intestinal ulcerations. We must keep in mind, however, that the early lesions of intestinal involvement are not ulcerations, but microscopic tubercles. It should also be remembered that intestinal tuberculosis does occur fairly frequently as a complication of early pulmonary tuberculosis.

Perhaps the greatest handicap we have at the present time in regard to intestinal tuberculosis is our lack of a definite, practical means of diagnosis. We know that in at least a third of the cases with intestinal tuberculosis, even where the lesions are very extensive, there are no symptoms or signs which draw our attention to the abdomen. Again, we know that when symptoms or signs do occur, they are not proportional to the extent or degree of involvement. The early lesions may give severe symptoms and the symptoms of advanced lesions may be mild or absent.

It is also understood at the present time that tuberculosis of the other abdominal viscera, especially the spleen, liver, kidneys, peritoneum and suprarenals, does quite frequently exist as a complication of active pulmonary tuberculosis in conjunction with or in the absence of intestinal involvement. Physical signs and symptoms, then, as a means of diagnosis of this condition have been found wanting.

About eighteen years ago the X-ray study of the intestinal tract, following the barium meal, was introduced as a means

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of diagnosing intestinal tuberculosis. For a time it was felt that our problem was largely solved. Ex-

perience has proven otherwise. Further studies, particularly those based upon necropsies, reveal that a large percent of our intestinal cases still go undiscovered.

More recently, Boles and Cohen have given enthusiastic reports of the value of the double contrast enema in the diagnosis of tuberculosis of the bowels. We have yet to learn the value of this method.

From a clinical point of view, perhaps the most important thing that we have learned about tuberculosis of the intestine is that it is a curable condition, that it is curable whether it exists as a complication of early or of advanced pulmonary tuberculosis. The exception to this statement is where tuberculosis of the bowel is part of a general hematogenous infection or where it exists in conjunction with tuberculosis disseminated throughout the other abdominal viscera.

Evidence of a healed tuberculous ulcer of the bowel has, in the past, been regarded as very rare. Gardner, as well as others, has seen them frequently. I believe that those of us engaged in the handling of large numbers of tuberculous patients have many times seen tuberculosis of the bowel, demonstrated by laparotomy, existing as a complication of extensive pulmonary tuberculosis, become clinically well and remain well.

As has been suggested, the treatment of intestinal tuberculosis is not as satisfactorily understood as it perhaps would be if we were able to be more definite in our diagnosis of this condition. There is more or less of a general feeling at the present time that a certain percent of the cases complicating early pulmonary tuberculosis get well as a result of the general treatment of the pulmonary condition. It is also felt that even some of the more extensive

cases occurring with early or with fairly extensive pulmonary involvement similarly get well

The usual special routine of protection of the abdomen (keeping it warm), non-irritating diet, etc., does relieve a certain proportion of these patients symptomatically, but they, in themselves, are not very important as curative measures

Heliotherapy, both natural and artificial, as originally outlined by Rollier and modified for use in cases complicated with active pulmonary tuberculosis, used extensively in this country and abroad, has, where it has been possible to carry it out scientifically, been credited with symptomatic relief as well as cures in a large percentage of the cases treated. The one drawback to this method of treatment is that there are a lot of patients who are either too sick with their pulmonary involvement or are so situated that it is impossible to scientifically apply heliotherapy in any form

Surgery in the treatment of intestinal tuberculosis has, more or less recently, had its day, but has been found wanting. The important drawbacks in this method of treatment were the frequency of extensive bowel involvement, the involvement of other abdominal viscera and the inability of these patients to withstand the resulting serious shock of major surgery

The introduction of oxygen into the abdomen, or oxyperitoneum, in the treatment of tuberculosis of the abdomen is not new. It was used in Germany, France, England and India in the early part of the century and has been used fairly extensively in this country during the past twenty-five years, being originally popularized by Bambridge and Meeker of New York

The reports of the men who have intelligently and persistently applied this method of treatment of intestinal tuberculosis have always been very encouraging both as to symptomatic relief and as to cure. Recently Banyai of Wauwatosa Sanatorium in Milwaukee has reported in detail some fifty cases of intestinal tuberculosis treated by oxyperitoneum. These were all

cases unrelieved by other methods of treatment. There was a satisfactory result with this special treatment in 85% of those treated

I have used this method of treating intestinal tuberculosis for the past twelve years. It has been used on my services in the Orange County Sanatorium and the Los Angeles General Hospital as well as in private practice. It has not been used to the exclusion of other methods of treatment, but I feel it is, in general, by far the most satisfactory adjunct in the handling of these conditions

The factors which recommend it are, first, the simplicity of application. It can be carried out either in the office or at the bedside with the ease of a pneumothorax refill. Second, it can be used no matter under what circumstances or in what environment the patient may be compelled to take the cure. Third, it can be used as a diagnostic measure. As has already been mentioned, the diagnosis of intestinal tuberculosis, even under the best circumstances, is fraught with a good deal of uncertainty. Experience warrants the feeling that if patients suspected of intestinal tuberculosis are relieved by oxyperitoneum, our suspicion is justified, and vice versa. There are no particular preparations for or contraindications to its use. With proper technique, if the patient is not benefited, he is not harmed by this treatment

The technique, which has previously been described, is very simple. In twelve years' use in hospital and private practice I have never experienced any bad results

I am reporting a few cases in detail which illustrate, in general, the type of case treated and the results obtained

Mrs. S., aged 28, advanced, bilateral, fibro-caseous pulmonary tuberculosis. Severe abdominal symptoms, simulating subacute appendicitis. Laparotomy disclosed extensive tuberculosis of the appendix with intestinal involvement extending both sides of cecum. Operation followed by oxyperitoneum as follows

May 16,'29	250cc	Aug 3	400cc
May 30	400cc	Sept 4	370cc
June 14	400cc	Oct 13	400cc
July 8	400cc	Mar 27,'30	400cc

No other treatment for intestinal condition. After the first two or three treatments patient always asked for the oxyperitoneum when she felt the need of it. Patient well and leading a normal life for the past five years.

Miss M DeP, aged 27, advanced, bilateral, fibro-caseous pulmonary tuberculosis. Abdominal symptoms simulating fairly acute appendicitis. Surgery revealed extensive tuberculous involvement of the appendix with considerable involvement of the bowel on each side. Appendix was removed and oxyperitoneum given fifteen times in amounts varying from 300cc to 600cc over a period of a year and a half. No other treatment for the abdomen. After the first two or three injections, patient asked for the treatment when she felt the need of it. Patient well and living a normal life in North Dakota the past seven years.

Miss M C, age 32, chronic, fibro-caseous pulmonary tuberculosis with fibrosis predominating. Abdomen opened. Tuberculous appendix removed. Some tuberculosis of the bowel limited more or less to the cecal area. Oxyperitoneum induced and given twenty-three times in amounts varying from 350cc to 1200cc over a period of two years. No other treatment. Prolonged treatment is due to patient's asking for the injection. Patient well for the past five years.

Mr F F, age 26, advanced, bilateral, fibro-caseous pulmonary tuberculosis, caseation predominating. Severe abdominal distress, diarrhea (10 to 15 bowel movements a day). Oxyperitoneum given as follows:

Apr 9,'25	300cc	Apr 23	400cc
Apr 17	350cc	May 1	500cc

No other special treatment except rest. Abdominal distress relieved, bowel movements reduced to one or two a day, more or less normal in character. Pulmonary

condition progressed, abdomen remained comfortable.

Miss C E S, age 30, progressive, advanced, bilateral pulmonary tuberculosis. Came from outstanding sanatorium. History of 17 bowel movements a day for two months, loss of 24 pounds in that time, all treatment for intestinal condition ineffective. Oxyperitoneum given eleven times in amounts varying from 300cc to 400cc over a period of eleven months. No other special treatment given except rest. Bowel movements reduced to one or two a day after the first injection, and abdominal distress relieved although pulmonary condition progressed to death.

Miss E E, age 40, acute, exudative, unilateral pulmonary tuberculosis, rapidly progressive. Pneumothorax controlled lesion in the lung. Acute abdominal distress developed, 8 to 15 bowel movements a day. Oxyperitoneum was given as follows:

Feb 22,'34	300cc	Mar 3	350cc
Feb 26	350cc	Mar 15	350cc

No other treatment except rest. Intestinal condition was promptly relieved and patient went on to recovery without further disturbance.

Miss N W, age 18, acute, unilateral, exudative, advanced pulmonary tuberculosis. Acute abdominal distress with diarrhea developed as part of a general hematogenous infection. In spite of a well established pneumothorax, the disease went on to a fatal termination. Oxyperitoneum was given twenty-five times about a week apart, in amounts varying from 300cc to 500cc, over a period of nine months. There was marked relief of the abdominal condition in the early part of the treatment. Toward the end, due to systemic involvement, there was very little relief secured other than through the psychic effect.

The Mediastinum

IN CONSIDERING the pneumodynamics of collapse therapy, the mediastinum must come in for a major share of attention. We must visualize the thorax as three-chambered with the central chamber, or mediastinum, walled off from the pleural cavities by two elastic partitions

AN OPERATION FOR TUBERCULOUS EMPYEMA

(Continued from page 9)

a little air from the thorax and causes a gradually increasing negative pressure in the empyema cavity, for it is more difficult for air to enter through this valve-like wound than to escape from it. This fact is readily demonstrable (although in theory the valve might seem to work the other way) if the wound is opened by an instrument at a change of dressings, when air will enter it with a sucking sound. If much negative pressure is desired, overzealous and overcleanly nurses should be

cautioned not to change the dressings or to content themselves with changing the outer ones only and to leave the inner ones in place as long as possible—for many days.

This operation, it will be seen, differs entirely both in theory and practice from the valve recently proposed by Nichol for acute empyema. Details, with X-rays, case histories, and other data will soon be published.¹

¹Western J Surg

THE CAUSE OF TUBERCULOSIS

(Continued from page 11)

tubercle bacilli taken into the body at any one time, but is to a great degree determined by the physical condition of the individual. For example, a person who is in a run-down or debilitated condition because of over-work, poor food, unhygienic living conditions, worry, or by having recently had some other disease, such as influenza, is sure to have a much more extensive reaction than a person who is in the best of health. It has been shown repeatedly that tuberculosis and poverty, with its resulting poor living conditions, go together: the poorer the living conditions, the greater the incidence of tuberculosis. The great destructiveness of tuberculosis among primitive races, such as Mexicans, Negroes, and Indians, has now been shown to be caused largely by their unhygienic and inadequate living conditions, and not due to racial susceptibility. That is, people of this type generally live in small, overcrowded houses which are poorly ventilated and where the food is of

the poorest quality. In short, they live under conditions which markedly lower their resistance to disease and which at the same time favor the spread of germs. Environment is, then, a most potent force in shaping the course of tuberculous infection, just as it is in presenting opportunities for the reception of infection.

SUMMARY

- 1 Tuberculosis is caused by tubercle bacilli (germs) which are transferred from a consumptive to a well person usually in sputum.
- 2 Tuberculosis is not hereditary. I. e., a person is not born with the disease.
- 3 Tuberculosis runs in families merely because the chances of acquiring the germs are so much greater under such intimate relationships.
- 4 Tuberculosis is not acquired solely in childhood; no age is exempt.
- 5 A child or an adult usually overcomes the first infection with the production of a partial immunity to subsequent infections.
- 6 The immunity developed by a first infection may be broken down by massive doses of tubercle bacilli or by adverse living conditions.
- 7 It is the reinfection which takes place after the immunity of a first infection is broken down that produces active tuberculosis.
- 8 Environment is the most important force in promoting infection and in shaping the course of an infection with tubercle bacilli.

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ABSTRACTS



This department is devoted to abstracts of articles carefully and judiciously selected by the Editorial Staff

BREUER, MILES J. Tuberculin Therapy. *Annals of Internal Medicine* Vol 5, No 7, p 1447

For a number of years there has been considerable controversy over the efficacy of protein extracts of tubercle bacilli in the treatment of tuberculous patients. Successful results are ardently claimed by some, and denied with equal emphasis by others. The author believes that we have at present a sufficiently comprehensive conception of tuberculous allergy and tuberculous immunity to enable us to formulate at least a tentative working basis for the scientific use of tuberculin therapy.

Immunity is that characteristic of the tissues by virtue of which tubercle bacilli are not able to survive there. A subject with good immunity survives infection with tubercle bacilli, whereas one with low immunity dies quickly from the infection. Allergy is a sensitization of the subject's tissues to initial inoculation of tuberculo-protein by virtue of which subsequent inoculations produce inflammation in these tissues. The nature and severity of the symptoms will depend on the degree of sensitization that has been established, and the size of the subsequent doses. A subject rendered allergic by initial inoculation is also rendered to a greater or less degree immune. Yet, immunity and allergy are not the same thing, they do not even run parallel, but are totally independent of each other.

Injection of tuberculo-protein (tuberculin) has only a negligible effect on immunity. Tuberculin, therefore, cannot be expected to produce a cure by increasing the immunity of a subject. The effect of the injection of tuberculin into the animal body is to produce the allergic state. Subsequently, the injection of a large dose will produce a severe reaction, with inflam-

mation, exudation and necrosis. But, a series of smaller doses, properly graduated and timed will de-sensitize the individual and diminish the allergic state, so that larger and larger amounts of tuberculo-protein can then be administered without systemic or local disturbance. Therefore, in the treatment of a patient, tuberculin can only be used to reduce the allergic sensitization.

Allergy, however, is at the bottom of a large proportion of the patient's illness and clinical symptoms, of his distress and discomfort. His fever, his malaise and reduction in capacity for effort, his lack of appetite and loss of weight, are all allergic phenomena. Allergy is responsible for the inflammatory process with its exudation and its necrosis. The whole "toxic" and inflammatory picture is due to allergy. It is completely absent in non-allergic animals dying from lethal doses of tubercle bacilli.

The author reports 26 cases selected for their allergic symptoms—treated with tuberculin. These cases were controlled in that they had previously failed to respond to general therapeutic regimen. Seventy-six percent of these subjects showed improvement under tuberculin. As a contrast there is also reported 181 uncontrolled, allergically unselected cases in which only 43.6% showed improvement under tuberculin.

The effect of tuberculin is to decrease the patient's allergic sensitization. Clinically it ought to be useful in those cases where the allergic state is principally at the basis of the patient's symptomatology.

DAVIES, DANIEL T, HODGSON, H. GRAHAM AND WHITBY, LIONEL E. H. A Study of Pneumococcal Pneumonia. *Lancet*, 228 919-924 (April 20) 1935

This paper is based on the radiologic examination of 119 cases of pneumococ-



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cal pneumonia, and the results have been correlated with the clinical and bacteriologic findings, during the investigation approximately 1,500 radiograms were taken

Type I Pneumococcal Pneumonia—Type I pneumonia is the classic variety. It is sudden in onset and the physical signs during the illness are usually well defined. It is not surprising therefore that the x-ray appearances are also distinct and uniform. Of the Type I cases, 37 were followed through the infection.

It will be convenient to consider separately those which had no specific treatment (18) and those which had Felton's serum (19).

Untreated with Serum—Early signs. Of this group, two were radiographed within 30 hours of the onset, and in both of them x-rays showed consolidation on both sides of the chest, whereas clinical examination had suggested that only one lung was involved.

The established consolidation The opacity spreads outward from the hilum, involving the periphery last, and varies in density from hazy to dense. The authors have used the term "hazy" when the line of the diaphragm could be seen and "dense" when it could not. Of the 18 patients, only four gave hazy shadows, in two of these no physical signs could be detected and in the other two they were not characteristic of consolidation. In the 14 in whom the opacity was dense, the x-ray and clinical findings corresponded closely. In four of these, however, radiography showed more extensive disease than was indicated by clinical signs. It was somewhat surprising to find that in only eight out of the 18 was the pneumonia confined to one lobe, although clinically there were only two with definite signs that more than one lobe was involved. Consolidation was maximal on the seventh to eighth day. The average day of crisis was the eighth.

Resolution As soon as resolution begins—and not before—the hilar glands on both the affected and unaffected sides show obvious enlargement. Accordingly, when a case is radiographed some 10

days after the onset, it is possible to give an opinion whether resolution has or has not begun. The glandular enlargement which takes place during resolution is quite unlike the enlargement due to old pulmonary disease, where the glands are irregular in outline, here they are globular and appear swollen. The time required for complete resolution is very variable. Some lobes have appeared normal 10 to 14 days after the onset, while others have shown a delay up to the fiftieth. The average for the untreated Type I group was 20 days from the beginning of the illness. The rate of resolution presumably depends on the extent of the consolidation and its density. The authors' experience is that enlarged hilar glands are associated with rapid resolution, whereas calcified glands—the result of past disease—are usually associated with some delay.

Complications Two patients who developed empyema showed dense consolidation from the outset. Clinical signs were more reliable than the x-ray appearances in revealing this complication. It would be irrational to expect radiography to disclose a small layer of pus in an area already opaque through consolidation.

Severity of illness Although there were exceptions, the authors came to regard a dense consolidation as being usually associated with severe constitutional symptoms, a hazy opacity on the other hand was characteristic of the milder forms of pneumonia. Of 18 cases, eight were classified as mild, and of these, four showed hazy opacities. The milder the case the more rapid the resolution.

Extension of consolidation Only one case in the Type I group showed an extension of the pneumonic process. Despite an early crisis on the fourth day the initial consolidation in the right lower lobe was slow in clearing, and there was much enlargement of hilar glands. From the fifteenth day onward there was a gradual extension of the left hilar shadow which ultimately involved the whole of the left upper lobe. This gave typical physical signs four days after it was first

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noted on the x-ray films while the initial consolidation was resolving this shadow extended, and it remained persistent for some considerable time. The patient was radiographed as late as the 170th day, and even then some shadowing was still present. While a rapidly forming consolidation often as rapidly disappears, a slowly forming one frequently ends in delayed resolution and sometimes permanent fibrosis.

Serum-Treated Cases—Early signs Of the 19 in this group, five were radiographed within 48 hours of the onset. In all five a definite opacity was seen spreading from the hilum to a lower lobe. The physical signs were equally clear and no difficulty was experienced clinically in outlining the lobe involved, although in one case a smaller area of consolidation on the opposite side was only detected radiologically at that time.

Established consolidation Dense opacities were observed in 14 of the cases at the height of the illness, while the other five showed only a hazy consolidation and atypical physical signs. In five cases the clinical signs did not indicate the full extent of the lung involvement, and it is important to note that in four of these it was an upper lobe consolidation that was missed. The physical signs of upper lobe pneumonia are, in fact, surprisingly few.

The effect of serum treatment is to shorten the febrile period and induce an early crisis, but no material hastening of resolution was observed in these cases. Indeed, some with few signs of consolidation when serum treatment started on the first day showed progressive consolidation despite an early crisis on the third day. The average day of crisis in the first 10 cases which were treated in the second and third day of their illness was the fourth to fifth, whereas the clinical and x-ray signs reached their maximum on the seventh. Although the number of cases is small, the authors feel justified in stating that, in spite of the dramatic relief afforded by serotherapy, it has no demonstrable local effect on the consolidation.

Resolution The most rapid resolution was in a patient treated with serum on the second day. The crisis was on the third, and no radiologic signs could be seen on the seventh. In four which showed long delayed resolution—up to the ninetieth, fifty-ninth, fifty-first and thirtieth days—calcification of the hilar glands was present. Of these patients, nine suffered from chronic chest disease, and the average day of complete radiologic resolution among them was the thirty-first from the onset of the illness. In contrast, seven patients who were previously well and who were free of complications showed complete radiologic resolution, on the average, by the fourteenth.

Complications There were three cases of empyema in this group, and the one which was fatal showed bilateral empyema. In all three the consolidation was very dense from the outset.

Extension of consolidation was seen in only one case. The process eventually involved all of both lungs except the right upper lobe.

Type II Pneumococcal Pneumonia—Type II pneumonia is more severe than Type I. The toxic pallor and the quiet resignation of the patient contrast forcibly with the high color and restlessness of Type I infection. The onset is sudden and the signs of consolidation are usually well-defined.

Seven patients were studied from the fourth day onward. The general x-ray appearances differed in no way from those seen in Type I, but whereas in the normally progressing Type I infection the lung cleared up completely, leaving no trace of the inflammation, in Type II, there seemed to be a tendency to a permanent, although slight, increase in the density and extent of the pulmonary striae.

The relation between clinical and radiologic signs was more or less close. The infection was confined to one lobe in four of the patients, in the remaining three (two of whom died) two lobes were consolidated. Resolution was complete in a period varying from 12 to 31 days. Enlargement of hilar glands was observed as in Type I. (Continued in November issue)

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CASE REPORTS*



*This page is devoted to Queries and Answers as well as Case Reports

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LEUKOPENIA IN TUBERCULOSIS

By C H C

A young man, aged 26, weight 132 pounds, height 5 feet 10 inches, was first seen in October, 1927, with extensive bilateral cavernous tuberculosis, worse on the left. His hemoglobin was 85 per cent, red blood cells were 4,410,000, white cells, 8,375, with neutrophils 70 per cent.

Left-sided artificial pneumothorax was necessitated by repeated hemorrhages. In June, 1931, clear serous fluid developed. During its removal with an 18-gauge needle July 3, 1931, the patient contracted his muscles, breaking the needle at the hilt. It was removed under fluoroscopic control at the Biltmore Hospital. The maximum temperature for three days was 100° F. There was no wound infection.

July 11, the patient awoke with a temperature of 102.2° F, headache, prostration, nausea, and severe abdominal pain. No relief was obtained by ice bag or enemas. There was no rigidity, no tenderness, no jaundice, no enlargement of the lymph nodes. The spleen was not palpable. July 13, the leukocytes were 4,300, with 90 per cent small lymphocytes and no polynuclears. The pharynx was congested, but he complained of no pain or discomfort. Pentose nucleotides were not available, no response was obtained from leukocytic extract. July 16, the leukocytes had fallen to 1,200, no granulocytes were present. The throat was sore, only con-

gestion was visible. He returned to the Biltmore Hospital, and his temperature ranged from 102 to 104° F. July 17, 500 c c of whole blood were transfused. His hemoglobin was 80 per cent, red blood cells were 4,190,000, white blood cells, 1,600, sm lymphocytes, 85 per cent, with no polynuclears. The throat was sore, but showed no ulceration. July 21, white blood cells were 1,450 with no polynuclears. Roentgen radiation was administered over long bones, after which the leukocyte count was 2,400, with 4 per cent polynuclears, this being the first time in eight days that the granulocytes had been seen in the peripheral blood stream. Radiation was repeated two days later. The leukocytes rose to 6,350 with 50 per cent polynuclears, and there was marked symptomatic improvement. July 25, an ischio-rectal abscess was discovered. The white count was normal. The abscess was evacuated, convalescence was normal.

Without remission he continued improvement in his general and tuberculous condition. He returned to his home in Indiana in July, 1932, one year after this episode and has remained well since.

The case is interesting because of the length of time that granulocytes were absent from the peripheral blood stream, longer than is considered compatible with life. The only possible etiological factor was continued self-administration of mild doses of allonal, unknown to me.

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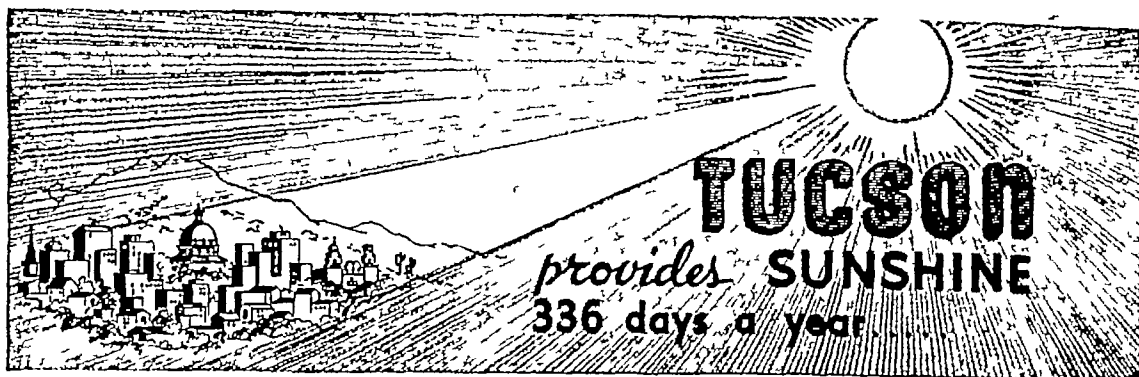
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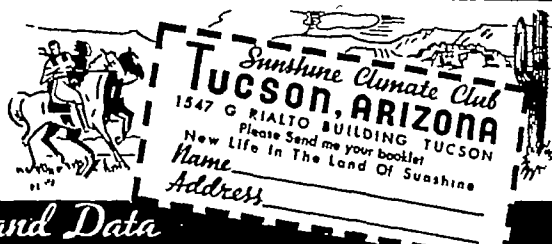
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TEMPERATURE (Normal monthly—40-year average)	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
RAINFALL (In inches—40-year average)	.8	.96	.81	.32	.34	.33	2.4	2.46	1.0	.8	.76	1.09	11.57
HUMIDITY (Monthly—40-year average)	61	55.6	44.8	40.4	28.4	29.3	54.3	57.3	47.1	44.8	57.1	74.3	49.5
	P.M.	33.3	27.7	22.4	22.6	15.9	17.7	26.7	35.7	29.0	26.5	41.1	29.9



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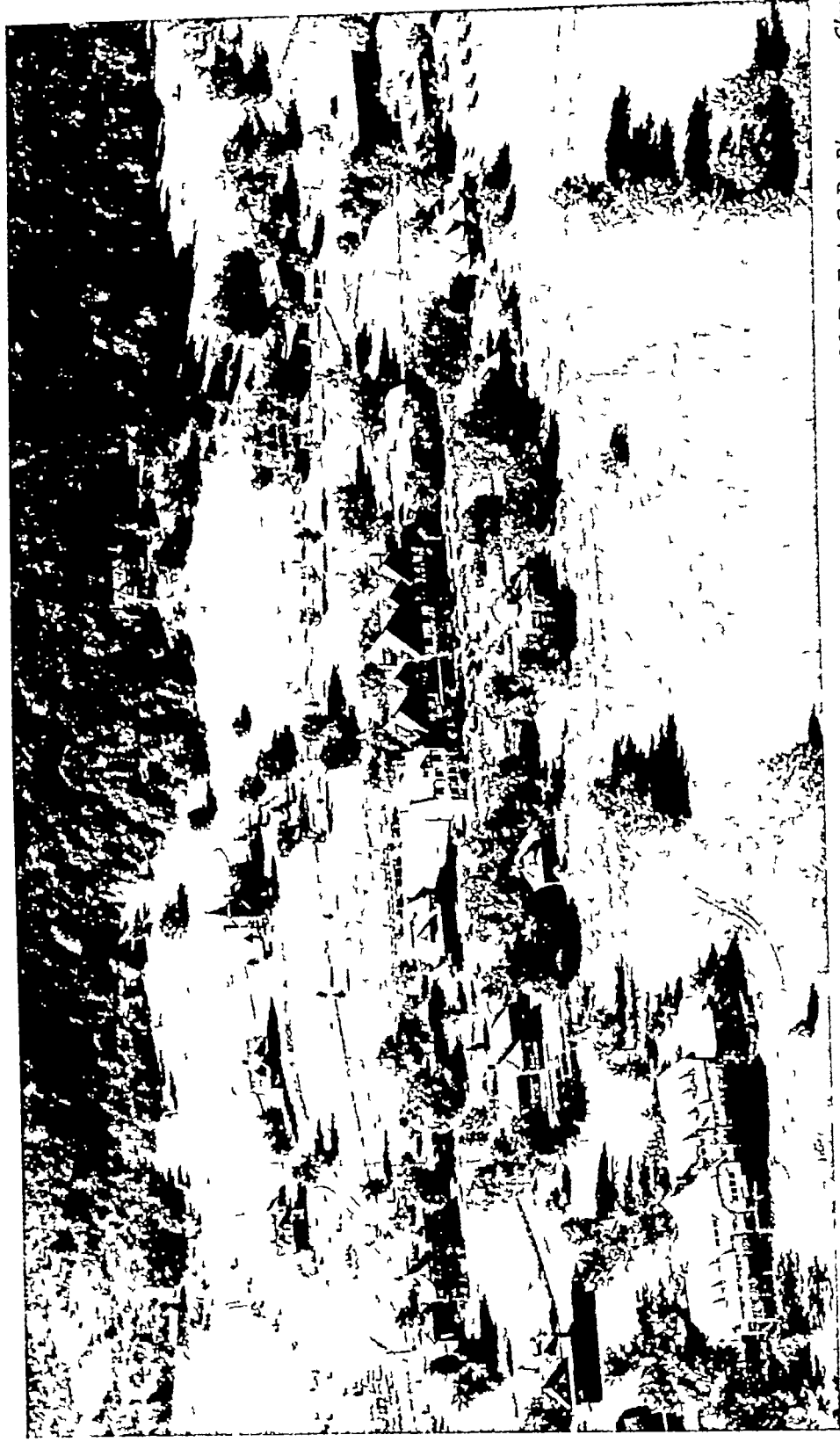
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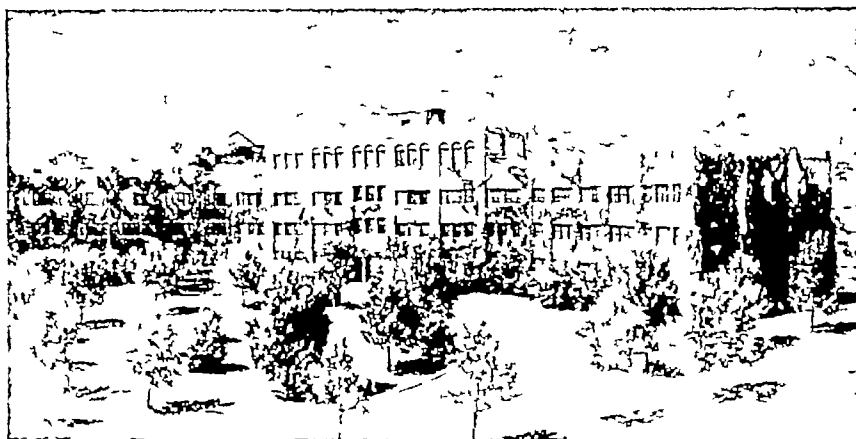
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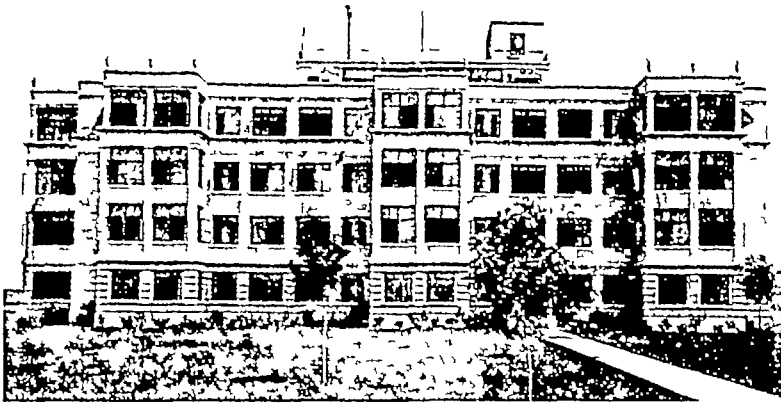
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C M HENDRICKS EDITOR IN CHIEF

(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"
Lawrason Brown, M D

Editorial Comment

Pneumothorax, "With a Bang" THIS EXPRESSION used in the 1933-34 issue of the Bulletin by the City of Chicago Municipal Tuberculosis Sanatorium, is very significant. This particular issue of the Bulletin is very interesting and is confined to Collapse Therapy. The City of Chicago is doing a great work and is one of the leaders in dealing with the tuberculosis problem, especially in the application of the principle of "Contagious Disease Control."

The Bulletin cites a changing picture with regard to Collapse Therapy and shows how wide-spread this treatment has become during the past three years. This is of special interest to those of us who began Collapse Therapy in 1907, '08, '09 and '10. We were just as enthusiastic then about pneumothorax as we are now and applied it in bilateral cases, the writer doing his first bilateral case in 1914. This patient is well and holds a very important position today.

We have learned a lot about pneumothorax in the past twenty years—its value and its limitations. The question in the minds of many today seems to be, how early should Collapse Therapy be applied? This question is not a new one, we were debating it twenty years ago. Now that Collapse Therapy is going over "with a bang," we will be interested to see what

the end results and conclusions will have been arrived at ten or twenty years from now. Like all things of great value, due to enthusiasm it will be over-worked and in the end these "bang" enthusiasts will arrive at the same conclusions that the "pioneers" in pneumothorax have long since drawn, viz, not to apply it as a routine measure in every case of pulmonary tuberculosis, that each individual case is an entity unto itself, that the wholesale application of any form of Collapse Therapy cannot give the end results that careful study and observation prior to the application of Collapse Therapy as well as during the life of the procedure, can give. Anyway it will be interesting to follow the results of those men who are putting pneumothorax over "with a bang" and applying Collapse Therapy on a "mass production" basis. C M H

Enthusiasm in Collapse Therapy THE TESTED and proven treatment of tuberculosis by rest is under attack both in the professional and lay mind. This is reflected in the recent article of a popular lay writer on medical subjects (Paul de Kruif) who says "Just as stethoscopes are useless in detecting early tuberculosis—so in the same way the famous cure by good food, fresh air, and

simple rest in bed is a terribly feeble defense against consumption" This article then elaborates on collapse therapy and particularly surgical measures as employed in a large municipal clinic

Enthusiastic as I am about pneumothorax and methods of surgical collapse, I believe that the attitude expressed is extremely bad, both for physician and patient

Although collapse therapy is an absolute essential of treatment in many cases, yet in no case can rest, both mental and physical, be disregarded. Rest is the initial treatment in every case. Many an individual is made suitable for proper collapse therapy only by preliminary rest. In most cases the eventual success of collapse measures can be assured only by continued rest and sanatorium routine.

The progress of treatment demands that clinicians remember these facts, not forgetting that early collapse therapy is also a prime essential in a great many cases

V S R

Treat Yourself? PEOPLE WHO have tuberculosis undoubtedly discuss their disease among themselves more than people with any other disease. Their symptoms, their experiences here and there, this type of treatment and that, this doctor and that, are all freely discussed. To a certain extent this discussion may be harmless and in some instances advantageous. Certainly, some of these people learn something of value from each other which may cause them to avoid many pitfalls previously encountered by a fellow-sufferer. Conversely, many patients actually harm themselves immeasurably by acting upon the advice of some "old head" in the T B game.

Many a patient who has been "through the mill" or, in most cases, is still going through it, sets himself up as a walking encyclopedia on tuberculosis. He has been everywhere, seen everything, and read everything regarding tuberculosis. He knows how the disease is cured and is glad to tell a fellow-sufferer about it although

he never seems to make the grade himself. In most instances his treatment is not based on medical supervision. He doesn't believe a doctor is necessary in the cure.

A young woman patient who has been tuberculous for three years reported that she had been in contact with several "encyclopedias" in that period of time. They advised her to change doctors, to have a phrenectomy, to have pneumothorax, to exercise and to rest, and finally to discharge all doctors and treat herself as it was simply a matter of rest, good food, etc. "At first," she said, "I was upset by all this advice and rather undecided about what to do, but I began to notice that my advisors and those who took their advice were dying off, so I decided to stay under medical supervision."

Many doctors are guilty of the "treat yourself" idea. They send patients home to bed, eggs and milk, or to a health resort and the same, plus plenty of sunshine, but with the advice that the cure depends on the patient's endeavor, and, therefore, no doctor is needed. These same doctors would gesticulate in horror if someone would suggest that no doctor be consulted in acute appendicitis, yet tuberculosis kills many thousands more people annually than does appendicitis. Many of these thousands of deaths might be prevented if proper treatment was instituted early or when proper indications are present.

The problem of tuberculosis no longer resolves itself into the statement that the early case gets well on rest and the remainder die. Moderately advanced and far advanced cases can be successfully treated in the majority of cases by some form of therapy, medical or surgical, and no patient should be denied his opportunity through poor advice.

It is common to hear a hopeless patient say "If only my doctor had told me the truth in the beginning."

R B H JR

Insomnia in Tuberculosis MANY TUBERCULOUS individuals suffer with insomnia. Others who complain of insomnia actually sleep much

more than they realize, and, usually, as much as they need

Several facts must be taken into consideration in arriving at the actual needs of the patient in regard to sleep. In the first place, patients who are carrying out an absolute rest treatment, and therefore are in bed practically the entire time, do not require nearly so much sleep as they did when they were active. Six hours in the twenty-four, in most such cases, is all that is needed, and it is not necessary that this be continuous. Many patients who are on bed rest sleep at short intervals through the day, and the aggregate of these intervals is usually more than the patient himself realizes.

Patients frequently have a morbid fear of some serious result following insomnia, and consequently plead for something to make them sleep more. As a result of such pleading, real harm is often done the patient by the administration of sleep-producing drugs—more harm than could result from the loss of sleep.

In most instances where sleep-producing preparations are prescribed, these consist either of Barbitol derivatives, or of opiates. If the former is used, the patient is usually depressed and listless the following day. He does not have his usual appetite, and therefore does not eat as he should. Because of the sedative effect of such preparations, digestion is impaired even if the patient eats but little, and soon there is a disturbance which becomes more or less chronic.

If opiates are prescribed, all of the secretions are altered, constipation is either induced or aggravated, an increase in the dose is soon necessary and, eventually, the undesirable addiction to the drug results.

There are conditions which justify the use of opiates, the most common one being when there is actual insomnia resulting from cough. At times this can only be controlled by the administration of codein, but this should not be kept up indefinitely, even in such cases.

There are simpler measures to use for

insomnia, and these are often more successful than we think. Since most insomnia is the result of a passive congestion in the central nervous system, the somnifacients most in use produce sleep by inducing a certain amount of local anemia in the same area.

This result can often be obtained by the use of hot milk or some other light lunch, since this relieves the cerebral congestion by taking the blood from that area to the stomach to digest the lunch. Frequently, too, sleep may be induced by reading.

Knowing the untoward effects of sleep-producing drugs—we should exhaust all of the simpler methods at hand before resorting to them.

R B H SR

The Correct Position in Bed FREQUENTLY the physician is asked what position it is most desirable for the patient with tuberculosis of the lungs to assume when lying in bed.

Since the prime object in carrying out a strict bed rest is to secure, as near as possible, complete rest of the lungs, that position should be assumed in which the individual patient coughs least, since coughing certainly brings into action every part of the lung.

In bilateral disease, particularly when there is cavitation, the patient should be encouraged to lie on the more seriously affected side. This procedure not only decreases the expansion of the diseased lung and thereby promotes rest, but it also decreases the cough by stopping the continuous drainage from the cavity. The patient may turn to the opposite side at intervals to allow the cavity to drain.

Some patients cough less and are more comfortable when lying on the back—while with others this position aggravates the cough, therefore, there can be no rule which applies to every individual, and the best advice is that each individual should assume that position which to him seems the most comfortable, and the one least inclined to increase the cough.

R B H SR

The Importance of Physiologic Measures In the Treatment of Tuberculosis

The Sanatorium—The treatment of tuberculosis was still in such an unorganized state at the beginning of this century that gloom and hopelessness settled down on every home in which the disease was found. At that time the accomplishments of such pioneers as Brehmer, Dettweiler and Trudeau had barely penetrated the world's medical literature. It must be stated, however, that the sanatorium idea was spreading rapidly among the more careful students of the subject on the continent, particularly in Germany, and was making some headway in other countries. While the sanatorium was not backed by a comprehensive program, such as we have today, yet it was proving its worth to the few who were fortunate enough to be treated therein, and it was gaining converts steadily. Life in the open air with superalimentation, under the guidance of a physician who was a student of tuberculosis, were largely depended upon for the results which were obtained at that time.

To the few tuberculous patients, however, who had the good fortune to be treated in a sanatorium, the word soon took on a magic meaning because of the fact that health was regained therein, while it rarely occurred as a result of the "let-alone" policy on the outside. The sanatorium became recognized as a place where those in despair could find encouragement, and the hopeless could take hope, yet as we look at it from the standpoint of our present program of sanatorium treatment, it was very inefficient, but it was the best that there was and a great improvement over anything else that had ever been suggested for the care of the tuberculous patient. Inefficient as it was, it gave an opportunity for many to regain health who otherwise would have been consigned to certain death.

The Evolution of Treatment—The treat-

BY
F M POTTENGER, M D
Monrovia, California

ment of tuberculosis has been an evolution and will continue to be for some time to come. The last word has by no means been said. Early diagnosis and prompt treatment would make great changes even today. It would reduce the necessity of using surgical methods to a much smaller group than are receiving such aid today.

Surgical procedures are advocated with such zeal and persistence in the literature of tuberculosis in recent years, that there is a possibility that they may occupy a much larger part of the stage than they should. They are not intended for the treatment of simple cases of early tuberculosis, but for the more advanced cases which have undergone destructive changes. Being successful in these, their use is now being urged in earlier cases, forgetting the tendency for tuberculosis to heal, and oblivious of the injury that may be done to the respiratory and circulatory mechanism by operative measures. Since operative procedures are crowding into the background many important and successful features of therapy which have stood the test of time, it might not be without value to call attention once more to physiologic measures and the technic of employing them, and the results which may be expected from their use, particularly while the lesion is limited. Every practitioner of medicine should realize the importance of the physiologic principles of rest, diet and hygienic living in the treatment of active tuberculosis, and furthermore, should apply them in the treatment of patients immediately on a diagnosis being made. No matter what the final treatment shall be, or who shall carry it out, these simple measures should always be instituted when the diagnosis of active tuberculosis is made.

Treatment by surgical methods, in no way conflicts with the use of physiologic

measures, in fact, should always be supplemented by them in order to produce the best results, so should surgical measures always be applied when the conditions indicate their use. The only place for difference of opinion is as to when the one or the other shall be relied upon as the main procedure. Surgical measures will be necessary for many patients until the tuberculous problem is so thoroughly controlled that early diagnosis and immediate treatment are made the rule.

Those who treated tuberculosis with the inefficient methods which were at the profession's command in the early years of this century produced many favorable results and need not be ashamed of their accomplishment, provided they were using the measures intelligently and conscientiously as they were understood at that time.

Some Results of Early Treatment—The results at the beginning of the century in no way compare with those produced by the best technic of today. We had an inadequate conception of rest, little respect for the digestive capabilities of the patient, no mechanical methods of adjusting the thoracic cage to the lung volume and inducing enforced rest, and a very imperfect conception of the importance of controlling the patient, yet we assisted many patients in overcoming their disease. Eleven of the thirty-six patients who spent the first Christmas at the Pottenger Sanatorium in 1904 are still living, and taking a normal part in life's activities. Twenty are known to be dead, and the condition of five is unknown. This shows a percentage of 35.5 of those whose whereabouts are known and 30.5 per cent of the entire group of patients as carrying on the natural activities of life thirty-one years after completing cure.

This group was not made up of any too favorable a class of patients either. Many of them suffered from advanced disease, yet they were chosen with greater care than we show in admitting patients to private institutions today. At that time we excluded those whom we felt reasonably

sure would not improve. However, as time advanced and experience grew, our opinion as to the degree to which the disease is curable also changed, and the percentage of patients for whom help is withheld has become steadily less and less. Today, with our better understanding of the application of physiologic principles, and with the development of mechanical measures and surgical procedures, the ability to bring about healing of the disease is steadily increasing.

What can be accomplished with physiologic measures—No one, no matter how wide his experience, can predict with accuracy whether or not a given patient will regain health. Very often the impossible seems to have been accomplished. It is rare, however, that we see a patient decline who enters upon treatment with a favorable prognosis. On the other hand, we frequently see an unfavorable prognosis turned to a favorable one. There seems to be an almost unbelievable and unlimited tendency for tuberculosis to heal, when it is properly treated.

Unless the lungs are in a condition of extensive acute softening, further breaking down and further extension of the disease may be checked in a very large proportion of patients provided they are treated by rest under proper guidance, as is done in a well conducted sanatorium.

The reason for qualifying the sanatorium to one that is well conducted is because there are sanatoria and sanatoria. No institution can go beyond the conception and intelligence of its directing head plus the facilities which are at his disposal for carrying out his conceptions.

Our best present-day technic of sanatorium treatment is very efficient, our poorest makes a mockery of the sanatorium idea. Our best regimen consists of the application of measures which will assure to the patient the most efficient physiologic balance consistent with the pathologic conditions present, aided when necessary by the particular operative procedure which will assist in overcoming mechanical conditions which interfere with healing.

The principles as established by Breh-

mer in the first successful attempt at sanatorium treatment—the isolation of the patient with hygienic living under the constant guidance of a physician—have been modified by our increasing knowledge, and expanded to include the following

- 1 Rest—general and local during the clinically and pathologically active stage of the disease,
- 2 Exercise when danger of toxemia and spread of the disease has passed, provided there are no contraindicating complications,
- 3 An abundance of food suited to the nutritional requirements and the digestive peculiarities of the patient without superalimentation,
- 4 A psychology of hopefulness and confidence in being able to meet the clinical and pathological problems which arise, which is justly based on past accomplishment,
- 5 The application of air and light baths according to the capabilities of the patient to gain benefit therefrom,
- 6 The use of focal stimulating measures such as sanocrysin and nonspecific protein therapy
- 7 Tuberculin for its focal reaction and its assistance in increasing immunization and promoting healing
- 8 Operative measures for overcoming mechanical conditions which interfere with healing, and for adjusting the decreased lung volume to the capacity of the thoracic cage

The difficulty with so much of the physiologic program is its simplicity. Among the physiologic measures there is no single spectacular remedy to which the patient can point as offering "cure." When people are ill they desire to have something directed definitely toward their cure, such as iron and liver for anemia, insulin for diabetes, and an operation for appendicitis. Medical men have not yet arrived at the point where they think physiologically, in terms of the patient's reaction, so they, too, think too much in terms of the disease. Naturally they are baffled without some direct mode of attack. Therefore, it is little wonder that the value of physiologic

measures is underrated, and the technic of their application suffers from a lack of preciseness.

Had tuberculin been introduced to the profession without the great fear of its producing harm, and had sanocrysin been first used in smaller doses, these remedies would both have proved to be very useful adjuncts to the healing of the disease and furthermore of great value to both physician and patient in helping to maintain an interest in treatment sufficiently long for healing to take place.

What I particularly wish to emphasize in this paper is the part that the physiologic measures will contribute to cure when applied with proper technic. There is a time when practically all patients suffering from clinical pulmonary tuberculosis can secure a healing by establishing a normal physiologic balance. In early tuberculosis compensatory changes are made with ease, and the mechanical factors which prevent healing rarely complicate the problem until after the disease has existed for some time. Even in acute exudative lesions, with or without cavity, the mechanical factors are not unfavorable. Compensation may be made readily and healing may follow. The factors which interfere most with healing of early tuberculosis are the fatigue brought about by exertion, particularly overexertion. In case the patient is not put at rest, the toxins which are engendered in the diseased focus, and whose action is increased by exertion, and the cough which disseminates the bacillus-laden secretions into uninfected portions of the lungs and thereby spreads the disease. The patient is put in the best condition for checking these and for withstanding those that can not be avoided by physical rest in hygienic surroundings with a diet of nutritious food, and by such physical rest as comes from an optimistic frame of mind, and a philosophical attitude toward the problems which must be faced.

Harmful psychic stimuli may be minimized by assuring the patient of the curability of the disease, by making him understand the harmful influence which is ex-

erted upon his protective mechanism by worry, fear and unhappiness, by aiding him in the solution of his distressing business, social and domestic problems, and by creating within him a confidence in the possibility of securing a favorable result.

It is not practical to discuss any one physiologic principle except in relation-ship to others, because no one who understands tuberculosis and the tuberculous patient would attempt to apply one measure only, nor could it be done if he did. So in the following presentation I shall discuss rest as being the most important physiologic principle in the treatment of active tuberculosis, and the one for which an effective technic has been developed, but I shall assume that other necessary hygienic measures are fully utilized.

Rest and the technic of employing it— Certain definite accomplishments may be particularly attributed to rest which should be recognized by every one who is called upon to devise a therapeutic regimen for patients suffering from tuberculosis.

Rest is that condition which makes the least demands upon the patient's energy-producing mechanism. It also makes a minimum demand upon the patient's respiratory mechanism and the diseased lungs are brought into a state of minimum activity. This is the state most favorable for reducing the absorption of toxins, for preventing the spread of the disease, for limiting the destruction of tissue, and for permitting the patient to improve his general metabolism and develop resistance to the disease.

The technic of applying rest is all important. Dettweiler's requirement that patients recline for many hours each day was a great improvement in therapeutic technic when compared with Brehmer's idea of exercise to strengthen and enlarge a heart which was supposed to be too small for the body which it served. The weakness of this program, however, as was gradually discovered, lay in the exercise which was permitted when the patient was not reclining. Often the good effects accomplished by the hours of reclining were counteracted by the exercise which was

allowed when not resting. So today many patients are preventing healing and causing unnecessary spread of infection and unnecessary destruction of lung tissue by exercise at a time when they should be resting. This failure to apply rest is not only the cause of many unfavorable results in patients in whom healing should take place, but it is costly in time and money.

A frank discussion of rest as applied in the various sanatoria should be of interest to the medical staffs of all institutions and should prove to be of value to patients.

The technic which we employ at the Pottenger Sanatorium is based on the idea that physical rest should be maintained as long as clinical activity is present or is likely to be brought about by exertion. Upon entering the sanatorium every patient with active disease is put to bed. Bathroom privileges and permission to sit up in an easy chair while the bed is being made is given to all except those who are very ill. But this is the extent of the privilege. For those who are very ill these privileges are withheld until the activity has quieted down, however, I have rarely found typhoid rest necessary except during some emergency, such as hemorrhage.

Bed baths are given by the nurse until such time as the patient is able to be up three hours without tiring, and in case the patient is very ill even the linen is changed without the patient getting out of bed. All food is served on trays so that the patient is not required to exert himself to get ready for meals. In order to still further reduce the motion in those tissues which are the seat of greatest activity, a shot bag is worn for hours each day over the affected part.

Reading, games, sewing, knitting and other simple ways of occupying the spare time are suggested for those whose disease is quiescent. The many necessary calls made by the members of the staff, nurses, maids, porters, tray boys, paper boys and so forth, afford something to interest and occupy the time of all. Diversion is also furnished by visits from other

(Continued to page 22)

A Decade of International Statistics on Tuberculosis

ON EVERY HAND one is impressed with the lowering of tuberculosis mortality, yet it might be questioned whether this means the ultimate early and complete eradication of this disease with the weapons now available and being used, or whether there will remain, for centuries at least, the dormant threshold level of cases which lie in wait, like a snake, ready to coil and strike whenever and wherever vigilance is relaxed

According to the latest report on the death rate in 46 large American cities for 1934, the whole group was 4% lower (6.96 per 10,000) than in 1933. However, sixteen cities showed increases: Denver 3%, Cleveland 3%, Buffalo 3%, Minneapolis 8%, Cincinnati 2%, Indianapolis 3%, Houston 6%, Rochester, New York, 18%, Columbus 15%, Oakland 12%, Atlanta 16%, Akron 3%, Syracuse 3%, Omaha 39%, Paterson 7%, and Elizabeth 21%. Akron, Ohio, had the lowest rate, 3.5, and San Antonio the highest, 14.5. Negro deaths showed a rate of 22.09 per ten thousand, while the white rate was 5.6

To combat a disease it becomes essential not only to know its origin and its nature, but, in addition, its frequency, which can only be discerned from accurate statistics. Statistics are the means of evaluating the success of measures used to combat a disease. Statistics may be confused by false or changing grouping, by inexact diagnoses, and, especially, by reducing or extending the realms of registration areas. Modern statistics require mathematical formulation and checking which were not available for earlier statistics. With the aid of correlation statistics, Wolff showed that in the states of Europe with growing industrialization, with increasing general well being of the average population, mortality decreased. He noted a relationship between home crowding and tuberculosis but not between carcinoma and housing

BY
ARNOLD MINNIG, M. D.
Denver, Colorado

In Germany, the last decade saw a reduction from 12 to 7.5 deaths per 10,000 from all forms of tuberculosis. Flatzeck-Hofbauer believes a common level of 7 to 8 per 10,000 has been reached in Germany, United States, and Great Britain as a result of a well organized plan of combat through hygienic living. Flatzeck further believes the regression in tuberculosis occurred in two distinct periods: the first, 1885-1925, in which there was a definite diminution of the mortality, morbidity, and illness displayed mainly throughout the working and great middle classes; in the second period, from 1925 on, the results concern the improvement of lethality through advances in medicine and social conditions. Ascher attributes the lowering death rate in the older age classes to a protection of this class against heavy labor by machines and shortening of the working hours. Gunkel lays stress on the social factor, the hereditary factor, the specific and the medical therapeutic factors as contributing to diminishing mortality. The greater decrease in Germany is accounted for by the efficiency of the organized social and medical attack. Geissler, over years of observations, noted the striking effect on the working classes and the consequent leveling of mortality to 8 per 10,000. International statistics are confused by the age of civilization infection, and therefore only comparative interval figures for the same area are enlightening. However, it is noteworthy that Biraud reports a diminution in European countries, the United States, eastern Canada, Australia, New Zealand, and in Japanese states, and this in spite of more efficient diagnoses. Stationary, or on the increase, is the mortality for middle and South America, in India, in the Malay states, in French Indo-China, and China. Likewise, the tuberculosis transmitted from Europe

to Central Africa is spreading, while in French North Africa and the South African Unions, where the disease has been in existence longer, the figure for the white population is markedly declining, is stationary among the mixed races, but is increasing among the natives. Since the World War, there is a marked diminution in Sweden, England, Switzerland, and Germany. Dunn points out the existence of a disease minimum below which it is impossible to progress. In India the annual figures are inclining (31 per 10,000) and the heavily infected urban population are carrying the disease to the rural areas. The general hygienic and social conditions are bad, sanatoriums and dispensaries are lacking, while in the Scandinavian countries and in Holland the number of tuberculosis beds is greater than the mortality, and in Britain, the United States, and Germany they are equal, France has 2 deaths per bed, and Italy has 5 to 1 bed. In Italy, a regular and marked decrease in mortality has only begun since 1925. The female mortality between 5 and 19 years is higher than the male in Italy. In France, the mortality is relatively high, and statistics are unreliable. In Marseilles in 1926, the cause of death was unknown in 50%. The mortality decline is greater in the cities than in rural districts. In Madagascar the frequency and malignancy of tuberculosis is high (1/7 of the mortality). The same exists in Algeria, Morocco, and in the Sahara. Here the disease was rare before the World War.

Belgium shows a favorable gradual declining curve (around 7 per 10,000). In the Belgian Congo, infection varies from 10 to 60 per cent. Tuberculosis mortality in Switzerland has regressed less than the general mortality. Cities and industrial vicinities have shown the greatest decline. In Rumania and Greece the mortality is high. Lack of organization can yield little in these countries. In lower Hungary, dust and heat in summer, excessive cold and sharp winds, as well as unfavorable housing (14% without basements) act detrimentally. In Denmark, where favorable figures attain, no difference for

rural and urban infection is noted, and there are 131 beds available to 100 deaths. In Greenland the morbidity (13-17% with pulmonary tuberculosis) and mortality are high. Figures for Lithuania, (287 per 10,000) Estonia, and Poland are high with no tendency to a decline in mortality. Figures for Russia are not satisfactory, since death records were inadequate until 1925. The curve peak of war years was maintained longer than in other countries, and there was a sharp drop from 1923 on, coincident with social improvement. The mortality among the Kurds, Tartars, and Bulgars is distinctly higher. Mexico has shown a marked decline from 1900 (50 per 10,000) to 1929 (13), but racial statistics are lacking here. In Argentina and Brazil, tuberculosis is on the incline, while in the Philippines, no strides were made between 1926 (29.3 per 10,000) and 1930 (30.55). The mortality among Indians in the United States, Canada, and Mexico is exceedingly high. The racial problem, especially as concerns negroes, is complicated by location in the world. In many countries, the view is taken that tuberculosis is spread from the city into rural areas and that the incidence parallels the density of population. In rural areas infection of man with bovine tuberculosis assumes importance. Age statistics are numerous in civilized countries but are variable even as to nursing mortality, although a favorable decline is evident in all ages of childhood. If present figures prevail, the view of a predisposition to tuberculosis infection among the children of tuberculous parents will be unjustified (Schlesinger). In some countries (Serbia, Poland, and Russia), infection of children shows an unfavorable inclining curve as measured by tuberculin tests. In the United States the incidence of tuberculin positive and tuberculous children among negroes and Indians is far greater than among the white. The school age infection figures are variable but increase with age is evident in all. The figures on sea-faring individuals are variable and unreliable, the rule of return-

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Bilateral Simultaneous Pneumothorax; Report of Case with Discussion

THE TREATMENT of Pulmonary Tuberculosis by means of Artificial Pneumothorax has been a well

BY
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recognized therapeutic measure for many years. Its position in the field of collapse therapy is perhaps more firmly established than any of the other well recognized measures now in use to bring about cure of a tuberculous process by this means. During the past few years the use of Bilateral Collapse Therapy has become more widely recognized, starting as an alternating process in which first the more diseased lung was collapsed and, if necessary, after re-expansion of this lung followed by collapse of the contra-lateral lung, until now large numbers of patients are receiving bilateral simultaneous artificial pneumothorax with excellent results.

It is obvious that the cases suitable for this form of therapy must be very carefully selected and watched in every detail and that such type of treatment should only be undertaken by one well versed in the art of pneumothorax therapy. It is worthy of note that recently the use of bilateral apical thoracoplasty has been proposed and carried out with a fair degree of success in those cases in which pneumothorax therapy was not feasible because of pleural adhesions. As a matter of fact bilateral collapse therapy is no longer confined to pneumothorax only, but any two, and rarely more, of the well known procedures are now used on the same patient at the same time. It is not the purpose of this brief note to go into a lengthy discussion of this now well recognized phase of collapse therapy, but merely to call the attention of the man in general medicine to the fact that bilateral collapse is feasible and that one should not become discouraged because of the presence of bilateral excavation before careful study and observation has ruled out the possible use of this form of therapy.

In presenting this case, which I have captioned "A Case of Bilateral Simultaneous Selective Pneumothorax," it may be true that we are dealing here with only one case in which the end-result was ideal and does not give a true picture of the end-results in a large group of cases. One must not forget that the outlook for the average patient with extensive bilateral involvement with cavity formation is under ordinary circumstances a gloomy one and that despite this gloomy outlook bilateral collapse therapy has accomplished wonderful results in a fair proportion of cases. In treating tuberculous patients we should always aim for the ideal. This case presents all the ideal features of successful pneumothorax therapy and should serve as a criterion in judging the use of bilateral collapse therapy. Bailow and Kramer and many other writers have called attention to Selective Pneumothorax as the ideal method of collapse (a type of pneumothorax in which the diseased portion of the lung, more by virtue of its loss of elasticity than by design, remains collapsed while the healthy part of the lung is expanded and functioning). That this patient was fortunate enough to obtain this type of collapse on both sides is of itself worth recording.

Report of Case

Mrs J D, age 31, onset of tuberculosis indefinite, following death of mother from tuberculosis she began to complain of tiredness, weakness, loss of weight, and persistent dry hacking cough. She first came under my care July 30, 1930, when physical and x-ray examination disclosed the presence of a Moderately Advanced Active Pulmonary Tuberculosis with infiltration involving the right upper lobe where cavity formation was present subclavicularly, the left apex presented definite evidence of infiltration. Sputum was positive for

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Juvenile Tuberculosis

JUVENILE TUBERCULOSIS

is characterized by a definite complex of symptoms. For an illustration I will

give the description of the following typical case—one of many hundreds which have come under our observation.

A boy, age eight, son of a physician from a neighboring city. The father brought him to us principally because the boy was contracting one cold after another and having a slight afternoon temperature, at times reaching 100.2 (by mouth), but usually about 99.2 to 99.6. He complained of feeling tired in the afternoon, did not like to play with the rest of the boys as he used to do, and the teacher told the parents that their son was not as attentive and alert in school as previously. The parents also had noticed a change in his behavior. From a cheerful and happy child he had gradually become peevish and irritable. His appetite, which formerly had been excellent, became indifferent. Frequently he had severe coughing spells. Adenoids and tonsils had been removed, and as this operation had not caused any change in the symptoms, he was circumcised, again without any favorable results. The boy gave a history of measles at four years and whooping cough at five years. The parents were healthy. There had been a maid in the household who had occasional coughing spells but seemed to be perfectly healthy otherwise. When the boy was six years old, about a year and a half before we saw him, he had a slight attack of influenza.

On examination nothing abnormal could be found with the exception of enlarged cervical glands. Heart, lungs, liver, kidneys and blood were normal. But there was a definite D'Espine present. The whispered voice was intensified down to the sixth dorsal spine, and on fluoroscopic examination enlarged hilar glands were found on both sides and some peribronchial thickening could be seen. Small calcified glands were noticed bilaterally. These

BY

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findings were confirmed by X-ray film. The Mantoux was strongly positive.

We have here a most typical case of juvenile tuberculosis. It is by no means necessary to find a history which is so definite and gives all the symptoms described above. In fact, at times these children look extremely well, but the slight temperature elevations in the afternoon are usually present, and not infrequently spells of dry coughing. But all of these symptoms are by no means found constantly, and another important fact is that on X-ray examination these heavy hilar shadows and enlarged glands are not always to be seen, but in those instances we find a more or less developed D'Espine. Normally in small children the whispered voice in back of the spine becomes as a rule distant in the region of the twelfth dorsal spine, in children up to eight years at the second thoracic vertebral process and in children up to fifteen at the fourth. But if there exists a solid tumor (which is a good sound conductor) between trachea or the large bronchi and the spine (as is the case in tuberculosis or neo-plastic bronchial glands), then the whispered voice becomes definitely intensified further down than it should be found normally. This symptom is, in my opinion, of the utmost importance in spite of the fact that one reads in many textbooks and publications that it is not of great value, or even that it is negligible. Another symptom which I consider of importance is the anisocoria, enlarged pupils on one or the other side, caused by intra-thoracic pressure on the oculo-pupillary fibres of the sympathetic. We find it frequently with enlarged tuberculous glands in the posterior mediastinum.

Before describing the treatment and prognosis of these cases it might be of interest to discuss their pathology.

It is an established and generally acknowledged fact that the primary focus of tuberculosis is usually found in the lungs

after the very first invasion of the bacillus. With the following alveolitis a non-specific defense takes place, followed by an exudative perifocal inflammatory reaction. With a slowly developing specific defense, this perifocal inflammation changes into an indurative sclerotic one, from an anergic phase an allergic one develops. After the first infection by the tubercle bacilli, no symptoms appear as a rule. The allergic change and the appearance of sensitiveness to tuberculin develop very gradually. The earliest Pirquet after an infection has been recorded by Dietl after four days (*Archives of Kinderheilkunde*), but it takes usually from two to four weeks after the first infection before the cutaneous tests become positive.

The further progress of the infection follows with the growing primary focus chiefly through the lymphatic ducts into the regional glands, especially the glands in the hilum region, and we find then the picture of Ranke's primary complex. The development of this primary complex takes place at times without producing any outspoken symptoms. The perihilar infiltration might also develop at times so slowly and to such a slight degree that it is not noticed at all. At other times it produces only temporary symptoms of illness.

In the great majority of cases these processes of infiltration are so light that they can only be recognized microscopically, and the perifocal inflammation cannot be observed clinically nor by X-ray. At times only a slight cloudy enlargement and intensification of the hilum shadows are noticed fluoroscopically. If, however, the perifocal processes should be more severe, then we find frequently afterwards the picture of a bipolar shadow in the hilum region.

In this short treatise we are only interested in the light cases which clear up slowly but entirely and which leave only small calcified glands in the lung fields and slightly enlarged glands in the hilum region. The effect of the infection is over and a *restitutio ad integrum* is a rule, and the child may remain entirely well and

show no further symptoms. But other conditions might develop. An intercurrent sickness—measles, tonsillitis, whooping cough, severe cold, etc., etc., might undermine the present resistance and the old foci flare up again, or, in more serious cases, a fresh exogenous infection takes place. In this event, the glands might swell again and then produce the symptoms described above, combined frequently with severe coughing spells, almost resembling pertussis and due to mechanical pressure on bronchial tubes or nerves.

When we do find these enlarged bronchial or peribronchial glands, it is by no means to be understood that they must always be of a tuberculous character, but in these cases a differential diagnosis is of the greatest importance. We find enlarged tracheobronchial and bronchio-pulmonary glands in all infectious diseases which are accompanied by swelling of the glands in other areas of the body. We find them with infectious bronchitis, after influenza, after the different types of pneumonia, etc., etc. If a positive anergy is present, nothing is to be feared and the condition will become quiescent under general care. But if the cutaneous, or per-cutaneous reaction should evidence an allergic condition, then it would be a serious and at times fatal mistake to neglect the correct treatment.

Treatment —The most important part of such treatment is rest and X-ray therapy. Some of us will remember that we used to rely on surgery, for instance, for the removal of the tuberculous glands of the neck. Occasionally at the present time one sees those deep disfiguring scars which were the result of surgery. But no sensible surgeon would operate those glands today; they are treated with X-ray radiation, and the results are most satisfactory, the glands usually resuming normal proportions promptly.

Rest in bed is imperative if the child has fever. With rest we combine salt water baths, balanced feeding, twice weeklyunctions with a tuberculin ointment, and later on in the course of treatment, direct

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Use of X-Rays In Tracing the Reactions of Tuberculosis Immunity*

NO STUDENT in the biology of Medicine today dares neglect the use of the magic revealer of vital processes realized in the X-rays

BY
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lower lobe of the left lung, had broken down and had led to the formation of a considerable cavity

I cannot claim to be more than a spectator from the sidelines in this field since those now ancient days of a quarter of a century gone

The high temperature and ready toxemia of the patient amply proved her tendency to absorption, which at the outset of her illness required a fortnight's bed rest to subdue

Yet recent studies have impressed on me with something like the shock of a new discovery what is really an elementary principle in the interpretation of the X-ray film, namely, that we should perceive in the structures depicted not only the mechanical and anatomic alterations from the normal, but should deduce from these the play of physiological and pathological forces which has caused the tissue changes represented in the static pictures, and thus in cases due to bacterial infection we may hope to interpret the changes in terms of the reactions of immunity

It is not necessary in this audience to dilate on the modern discovery that the master-word in the control of tuberculosis activity is *Rest*, which, by the way, requires a technique in management known to astonishingly few of those who lack special training

I venture to believe that herein is a field of perception which is far from being adequately developed

The patient who is the subject of this paper taught me to realize as never before a purely objective sign of tuberculous activity, one which antedates even subjective and clinical symptoms of focal activity, and which still lingers when rest has restored the feeling of well-being and allowed temperature and pulse to return to normal

I will come at once to the point and say that only a few years ago I gained what was for me a new conception of the wealth of meaning that the chest film from a tuberculous subject might have for the student of Medicine and Immunology. This cultural revelation was only made possible by my association with Dr Kenneth Allen who made and interpreted the series of X-ray plates at critical periods during the early stages and throughout the course of a case of fulminating primary tuberculosis in a robust girl of 18 years

This objective sign of which I speak is *inflammatory congestion* centered in and spreading from the foci of tuberculous infection

We know that inflammatory congestion connotes active disease, and in a case of primary infection, such as I am describing, the waxing and waning of such congestions plainly follow over-exercise or subside with rest

To touch only upon the high points of the clinical record, it appeared probable that a Ghon nodule of primary infection, located about the mid-portion of the

The subjective distress and clinical symptoms excited in the tuberculous patient by acute exacerbations of the disease are apt to subside completely following a moderate period of rest, and the nurse or the unwary physician is tempted to allow the patient to then resume muscular exertion. But the careful attendant who first obtains another chest plate is apt to be astonished to find that the shadows cast by the diseased lung still de-

*Remarks of Section Chairman Symposium on Pulmonary Disease of the Midsummer Radiological Conference, Denver, August 29-30 1935

note inflammatory activity though the patient is symptomatically well

Thus, the objective signs of active pathology linger on the X-ray film, though all seems well in the bedroom, and it can be demonstrated that the X-ray evidence when it conflicts with the clinical estimate of the patient is a far safer guide for treatment than the latter

I doubt not that countless lives have been sacrificed to tuberculosis through premature resumption of exercise in patients in whom early rest has magically allayed the external symptoms of active disease

One such mistake may be tolerated, or even several,—but experience shows that haphazard repetitions of such insults tend to exhaust resistance and advance the pathological invasion

I will not here take up the moot question as to whether the allergic reaction manifested by focal congestion is not itself the prime force which excites resistance and leads to cure. My point is that the safest course is to look before we leap,—and we can only look by the light of the X-ray

This brings up the relation of X-rays to the study of immunity

Please remember that the primary infection in our patient was concentrated in the left lung—predominantly in the hilum and the lower lobe. Here the congestions were renewed with every clinical exacerbation and their hangovers lingered. It seems certain that these areas of the lungs, nearest the source of toxemia, must have been inundated beyond all others with bacilli and that, if the patient was to achieve cure, it would be this part of the lung that would especially show the scars of battle, as in fibroid deposits, etc.

But, as a matter of fact, in our patient *this most heavily infected area* nearly completely escaped all anatomical damage

I can only define the result as a manifestation of the most perfect stage of immunity, that in which the tubercle bacilli and their products undergo complete resolution—without tubercle formation,—i.e.

are presumably dissolved under the influence of lytic antibodies produced by the lung tissues reacting to intense infection which still fell short of tissue resistance

Now, while this perfect immunity was manifested in the immediate neighborhood of the focus of infection, something quite different was happening in the normal, distant right lung on the opposite side of the body

In an X-ray film taken when the patient had just recovered, symptomatically, from a series of imprudent exertions, the inflammation in the *left* lung was subsiding, but on the *right* side, that contralateral to the site of disease, there appeared for the first time a congestive shadow at the right apex. When next pictured, after several weeks of enforced rest, the whole upper lobe or more of the right lung was found stippled with milary tubercles. We must believe, then, that the assumed lytic antibody which had dissolved the infective matter on the left side was here lacking, or at least incompetent to annihilate the invading host of germs

So here a new immunological mechanism of defense was brought into play. Briefly, if theoretically formulated, we may postulate that the outlying tissues of the right lung, which had become hypersensitive to contact with tubercle bacilli, through some physico-chemical surface change held fast to the germs, and also became the seat of tissue reactions causing new cells from the general circulation to accumulate which surrounded the bacilli and imprisoned them in what we call tubercles

Briefly, to sum up, the X-ray films in this case seem to illustrate several factors and processes of immunity, *first*, is the allergic congestion which marks the intensity of tissue reaction to reinfection, *second*, is the evidence for resolution of the *materies morbi*, the tubercle bacilli, presumably through action of lytic antibodies, *third*, the apparent fixation of tubercle bacilli by hypersensitive tissues far from the focus of primary infection,

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Spontaneous Pneumothorax

IT IS NOT the aim of the writer to discuss in this paper the entire field of spontaneous pneumothorax

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with all of its causes. The discussion will be limited rather to that form of spontaneous collapse which occurs in otherwise healthy individuals. It is referred to in literature as idiopathic spontaneous pneumothorax. This is a term which should always be avoided, but for lack of a better term and a more comprehensive understanding of the pathologic background it is used. No doubt every physician, whether he is doing a specialty or a general practice, has been called at times to attend this type of case.

Lung collapses have been described since the days of Hippocrates. Some of these descriptions have been vague and indefinite, but enough information is given to convey the idea of collapsed lung. Many were probably due to tuberculosis, lung abscess or some other pathological process which was not diagnosed. Earlier writers, Laennec and Itard, described lung collapses from diseased lungs—no doubt tuberculosis.

Incidence Spontaneous pneumothorax usually happens between the ages of eighteen and thirty-five. It occurs about five or six times as frequently in men as in women.

Onset The attack usually follows some strenuous exertion either extrinsic or intrinsic. It comes on rather suddenly with pain in the affected side, and if the collapse is complete there will be dyspnoea. The complete collapse may be several hours following the exertion. In one case seen by the writer, there was an acute chest pain at the time of the exertion, but the actual collapse did not occur until three days later. It may occur without any definite exertion.

Diagnosis The diagnosis is usually not very difficult. On inspection, the side of the chest affected will be immobile or par-

tially so. On percussion, there will be hyperresonance on the affected side. On auscultation, there will

be absence of breath sounds over the collapsed lung with compensatory breathing in the other lung. The heart will be shifted to the opposite side. If the collapse is of the left lung, the heart displacement will be more noticeable. The Roentgen ray will confirm the diagnosis.

Course If proper care is taken these individuals soon recover. The lung usually re-expands in six to ten weeks unless there is an effusion, which will prolong the period of expansion. There may be some pleurisy with slight elevation of temperature during this period.

Prognosis The prognosis is nearly always good. These patients seldom die. In fact, so few die that post mortem examinations are rarely had to study the pathology which causes the collapse. When death does occur it is usually due to one of three causes: 1 Asphyxiation, which may happen in either unilateral or bilateral collapse. 2 Right sided heart failure. 3 Complications such as asthma. The accident does not predispose to tuberculosis.

Pathology The pathology responsible for the type of collapse discussed in this paper is more speculative than certain. In considering spontaneous pneumothorax from every cause, about 80 percent is due to tuberculosis. A small percent is due to lung abscesses, other infections and trauma. The idiopathic collapses are due to: 1 Emphysematous blebs, which probably cause the majority of them. 2 Tearing of a congenitally thin or fragile pleura by adhesions. 3 Cystic degeneration of the lung. 4 Localized bronchiectasis involving a single vessicle which dilates to the point of rupture. "Pascal's Principle" no doubt operates in this connection. 5 Atrophy of the visceral pleura.

Spontaneous collapse has a tendency to recur. Occasionally an individual is un-

fortunate enough to have a simultaneous bilateral spontaneous pneumothorax. Cases have been reported in which there was a congenital opening between the pleura, a spontaneous collapse of one lung resulting in a collapse of the contralateral lung also.

Treatment These patients should be put on absolute bed rest until the lung has had time enough to re-expand, which will be six to ten weeks. The opening through the visceral pleura will usually heal in a few days. If the patient is allowed up too soon, there is a possibility of a recollapse of the affected lung, which may cause troublesome effusion. If the distress becomes too great, enough air should be removed from the pleural space to make the patient comfortable. This procedure can be repeated if necessary. However, needling the pleural space should not be done if it can be avoided. It is easy to over-treat these patients. Out of the group of eleven the writer has seen, only one has needed air removed from the pleural space. If given an opportunity, nature will repair the damage done. The patient can help most by remaining at absolute rest.

Case Report

F R E, white, male, student, age 20, came under observation March, 1933. His family history was essentially negative. There was nothing remarkable in his past history. He felt well up to March 5, 1933. As he sat down to breakfast he developed a severe stabbing pain in his left chest which was followed by dyspnea. The afternoon before, he was struck on the chest while boxing. Examination a few hours later showed the patient slightly dyspneic with lagging of the left side of chest. There was a hyperresonant note on percussion over that side. Breath sounds were absent on auscultation. Fluoroscopic and Roentgen ray examination (Film No. 1) shows the left lung completely collapsed. The right lung was negative.

The patient was put on absolute bed rest for the first six weeks, and then gradually let up. In about eight weeks the lung had re-expanded. He had some pleurisy and shortness of breath during the first two or three weeks, after which he was quite comfortable. In September following he entered college and did a great deal of work outside of school to help defray expenses. He was examined frequently thereafter, and there was no further disturbance of pulmonary function.

On March 28, 1935, he was examined fluoroscopically, because he had been having some vague chest pains for several days. The note was made that there was no pulmonary pathology seen. He telephoned on the night of May 5 that he was having some acute pains through the right side of his chest, and was afraid that the right lung had collapsed. He failed to keep an appointment at the office the next day and was not seen until night May 6. He developed acute pain in both sides with marked dyspnea, and went to the hospital. Examination showed the patient in great distress, even cyanotic. There was very little motion to either side of the chest. On percussion, there was a hyperresonant note on both sides. The breath sounds were entirely absent on both sides on aus-



Film 1 made March 1933, shows complete collapse of the left lung. The right lung is apparently normal.

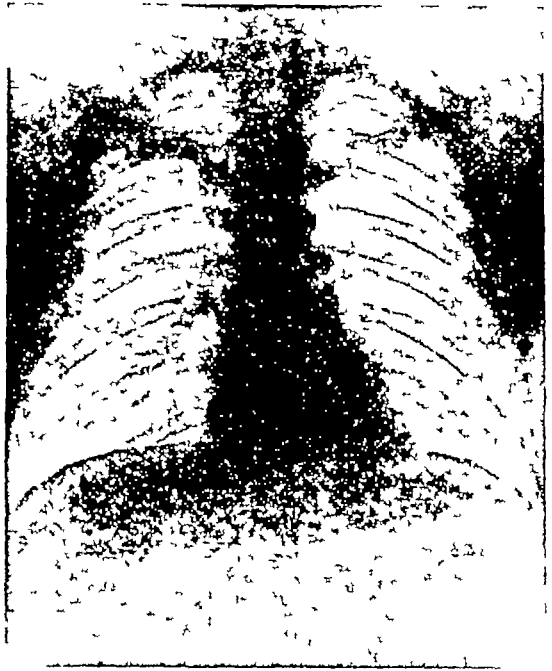
cultation A diagnosis of bilateral collapse was made from the history and the physical findings 1600 c c of air were removed from the left pleural space, after which he became much more comfortable After being moved to the fluoroscope, he again became dyspneic, and 1400 c c more air were aspirated from the left pleural space and 1100 c c from the right side This is more than is usually necessary to remove Film No 2, made May 7, shows the amount of collapse on both sides

The patient was discharged from the hospital at the end of five days with detailed instructions regarding rest He refused to take rest longer than ten days after leaving the hospital Fortunately, nothing serious happened A fluoroscopic examination at the end of three weeks showed both lungs almost re-expanded



Film 2 made May 7 1935, shows complete collapse of the right lung There is about 50% collapse of the left lung after 3000 c. c of air had been removed

Roentgen ray film No 3, made July 28, 1935, shows both lungs completely filling each pleural space with no pathology During this period of convalescence he was quite comfortable in spite of the fact that he failed to rest as he was directed



Film 3 made July 28, 1935, shows both lungs re-expanded with no apparent pulmonary pathology

It remains to be seen whether there will be further trouble of this nature in the future

Summary

During the past two and a half years the writer has observed eleven cases of idiopathic spontaneous collapse, all in males Eight have been unilateral with no apparent pathology Three were bilateral collapses One had a very small collapse on both sides when discovered There was questionably a fibroid pulmonary tuberculosis too Another had a collapse of the left lung first, and a year later the right collapsed There was no pathology found The third one was described above

TUBERCULOSIS caused 4,020 deaths in Texas during 1934, according to the State Department of Health It ranks third as a cause of death in this state The National Tuberculosis Association estimates that there are from 9 to 11 active cases per each death in any community On this basis there are at least 36,000 active cases in the state of Texas

THE IMPORTANCE OF PHYSIOLOGIC MEASURES IN THE TREATMENT OF TUBERCULOSIS
(Continued from page 11)

patients and by every one who passes by the room or bungalow. Then, too, there is the occasional visit of friends. Watching the birds and animals in the trees and parks also causes great interest, and helps the patient while away many a happy hour.

In this way the patients are kept happy and contented, and busy too, while resting, and, seeing themselves improve, they are looking forward to the time when they will be granted the privilege of sitting up, and then walking.

It requires considerable judgment to know when it is safe to permit certain patients to begin to sit up and take exercise. Nothing but experience will enable one to form the correct opinion in all instances. The experienced physician rarely finds it necessary to place a patient back on continuous bed rest after he has once started to sit up, but the one who does not have the correct idea of when activity has subsided frequently finds that he has allowed exercise to be taken too soon and

finds that the disease increases in extent and severity coincident with the increased exertion. On the other hand, now and then patients are kept in bed long after activity has ceased because of the continuance of some symptom as a slight rise of temperature or tiredness, which may be due to other causes.

When exercise has been instituted it must not be pushed too fast. The patient must always keep within his strength even after the disease has ceased to be active.

When all activity is past and danger of spreading or of breaking down seems no longer present we permit the patient to start sitting up. He increases his time out of bed by five or ten minutes each day, usually the latter, until three hours have been attained, then we consider that the average patient is ready to start walking.

I shall discuss the technique of applying exercise to the tuberculous patient in another paper, for it is just as important when the time comes for its employment as rest is when the disease is active.

A DECADE OF INTERNATIONAL STATISTICS ON TUBERCULOSIS

(Continued from page 13)

ment for the afflicted navy personnel making such figures difficult to obtain in this branch.

In modern times a sex occasioned tuberculosis mortality among women plays no role, and industrialization removes this factor of difference between male and female figures. The incidence among Catholic nuns (Sisters) shows a gradual decline. Tuberculosis in the aged is on the incline (Gottstein) figured on the basis of those living at a definite age, but in absolute values it is insignificant and declining, although its danger lies in its hidden course and indefinite diagnosis. Paroli and Michaud found 6% in men and 5% in women over 60 years of age (mostly open cases). Braeuning figures there were 146,250 open cases of tuberculosis in Germany in 1932 with an average duration of life of 3 years.

The problem of transition from latent to manifest disease is still unsolved, and whether exogenous superinfection, a flare

up of a primary lesion, or both play a role remains unsolved. Does conjugal tuberculosis assume importance? The figures are variable. Aside from exposition, disposition seems to play a role. The mortality and morbidity curve for tuberculous family hazards is without doubt decidedly higher than in non-tuberculous. Barclay found 7 times as many cases in the former.

Bovine tuberculosis is declining decidedly with the advent of Pasteurization.

The unbelievable appears to be that, especially in Europe, there exists even today, heavily infected regions that are ignoring the tuberculosis eradicating measures. Yet why, in some regions under almost identical measures, the mortality declines sharply while in others it does so only gradually, can only be explained on the basis of civilization and general hygienic grounds. That the sanatorium and its ramifications play a recognized

part both in reducing the level and maintaining a low level of mortality and morbidity in tuberculosis is universally recognized and depicted in all the statistics available. That it is a weapon to be kept

at the highest level of efficiency, according to modern statistical evidence, to maintain the lowest level of tuberculosis mortality and morbidity, is a rational and modern conclusion.

BILATERAL SIMULTANEOUS PNEUMOTHORAX

(Continued from page 14)

Tubercle Bacilli. Artificial pneumothorax was induced on the right side on August 1, 1930, and at the end of one month x-ray examination disclosed that the cavity was completely closed and that the pneumothorax was distinctly selective in type, the lower lobes being at most times fully expanded and functioning and the diseased upper lobe being fully collapsed. This was accompanied by a complete disappearance of all symptoms, repeated negative sputa, marked gain in weight, and improvement in general condition. In December, 1930, the patient was permitted to return to New York City, where pneumothorax refills were continued. In April, 1931, she again returned to Liberty, complaining of loss of weight, sweats, cough, profuse expectoration, fever, and tiredness. Sputum was positive for Tubercle Bacilli. X-ray examination disclosed that the right upper lobe was still completely collapsed and the lower lobe almost completely expanded, functioning and free from disease. The process previously noted on the left side had definitely extended and involved almost the entire upper lobe and subclavicularly close to the periphery a moderate sized cavity was present. The patient was given the benefit of six weeks of bed rest when further x-ray examination showed no change for the better on the left side and, if anything, that the cavity had become larger. In the meantime the pneu-

mothorax on the right side was maintained. On June 23, 1931, pneumothorax was induced on the left side. Again a selective type of pneumothorax was obtained and within a month's time the cavity was completely closed. The collapse was continued on both sides simultaneously, refills being given at weekly intervals, one week on the left and the following week on the right, about 500cc of filtered air being introduced each time, and a negative intra-pleural pressure being maintained at all times. This was again accompanied by a complete disappearance of all symptoms, marked gain in weight, and a remarkable improvement in general condition. Sputum was repeatedly negative for Tubercle Bacilli. Simultaneous collapse was maintained until October 24, 1932 (a period of 16 months), when the right side was slowly permitted to re-expand. Refills were continued on the left side until May, 1933, when it too was slowly permitted to re-expand. Since that time repeated sputum examinations have been negative for Tubercle Bacilli and repeated x-ray examinations (the last July, 1935) have failed to disclose the presence of the tuberculous infiltration previously noted.

REFERENCES

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2. Barlow and Kramer: Amer. Rev. Tuberc. 1922 vi 75
3. Lillenthal: Thoracic Surgery—Sanders and Company 1928

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JUVENILE TUBERCULOSIS

(Continued from page 16)

sun We use X-ray in these cases once weekly or every ten days, depending upon the reactions which follow. We have learned the great importance of small doses in the beginning. We usually start with 50 milli-ampere seconds, distance 32 inches, and use a 1mm aluminum filter, alternately raying the anterior and posterior surfaces of the chest. The great importance of gradually increasing the dosage of X-ray and heliotherapy is evident. The injections with tuberculin ointment have also to be watched most carefully. Reactions are not uncommon and the strength of these ointments must depend on these reactions. Injections of tuberculin are rarely used and only in selected cases. Besides, children do not mind ointment rubs, while they object most strenuously to the hypodermic needle.

The result of this routine of treatment has been excellent and belongs to the group of the most satisfactory therapeutic mea-

asures known. But it takes patience, there are no short cuts. In some cases after only a few weeks all symptoms disappear, in others it requires several months. In children which do not easily develop a resistance, it might take a year, but this is most unusual. The important fact is that all these children get well. How much resistance to tuberculosis the correct treatment of these tuberculous glands will provide in their future lives, is still an open question and can only be established definitely in years to come by following up the many cases which have come under observation and treatment.

It is rather a source of satisfaction to me that the suggestions which I made regarding the treatment of tuberculous bronchial glands in children in a treatise written for the Journal of Better Health in the year 1926, have been substantiated by our experience in later years.

USE OF X-RAY IN TRACING THE REACTIONS OF TUBERCULOSIS IMMUNITY

(Continued from page 18)

fourth, there is the local reaction of hypersensitive tissue assisted by allies from the general circulation, giving rise to the formation of tubercle.

In conclusion, under fairly complete rest, the hoard of tubercles in our patient's right lung underwent fibrosis or calcification, and within two years the patient, earning her own living as a teacher and indulging in vigorous exercise, described herself as in the best state of health in her life.

My remarks have had to do with a case of *primary* tuberculous infection, doubtless the problem would be greatly compli-

cated in a chronic case, the survivor of many relapses.

The conservative critic is bound to be wary of theory and it is with some satisfaction that I can announce here that a method has presented itself through which it is hoped the theoretical features of our contribution may be submitted to the test of animal experimentation.

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ABSTRACTS



This department is devoted to abstracts of articles carefully and judiciously selected by the Editorial Staff

DAVIES, DANIEL T., HODGSON, H. GRAHAM, AND WHITBY, LIONEL E. H. A Study of Pneumococcal Pneumonia. *Lancet*, 228 919-924 (April 20) 1935
(Continued from October issue)

Type III Pneumococcal Pneumonia—This form of pneumococcal infection is known to attack the debilitated and aged, and carries a high mortality. The course is often ill-defined, and the onset less sudden than in the types so far considered. Often the signs of consolidation are few. It is not surprising therefore to find that the opacity is unlike that seen in Types I and II. As a rule it is not homogeneous, frequently it is patchy and generally peripheral in distribution. The appearances also differ in that the level of the diaphragm usually remains unchanged. The date of resolution in this series varied between the thirteenth and seventy-second day.

This group, although small, contains most of the features accepted as characteristic of Type III infections. Of the 12 patients, five gave a history of chronic bronchitis, and in three of these calcification of the hilar glands could be detected. In the cases showing chronic disease of the chest, the consolidation was ill-defined and either resolution was delayed or the patient died. In contrast to these older subjects there is another class of patient—younger in years, with better defined consolidation, an early crisis and more rapid resolution.

It is significant that the authors have found more disparity between clinical and radiologic signs in this group than in any other. No clinical signs were discovered in four, yet three of these showed "hazy" opacities affecting one or more lobes. In only four of the 12 was there any close agreement between physical and x-ray findings. The reason for this disparity is the absence of any dense consolidation, it is patchy and more peripheral than

central. When a consolidation is lateral and peripheral there is still a good deal of lung surface, both anteriorly and posteriorly, over which a reasonably good note and unaltered breath sounds are audible.

Group IV Pneumococcal Pneumonia—Produced by a variety of non-specific pneumococci. Group IV pneumonia, although common, is less of a clinical entity than the others. Occasionally the infection is severe, but all grades may be met with, and grading is also evident in the local phenomena, some show well-defined consolidation, while in others there is little evidence of a local lung lesion.

In this group 22 patients were submitted to periodic x-ray examination. The opacity as a rule was only moderately dense and the distribution was usually peripheral. In one case the appearances closely resembled military tuberculosis, in two cases large cavities suggestive of tuberculosis appeared and disappeared completely during the illness. In the majority, the height of the diaphragm remained unchanged. The glands enlarged as resolution commenced, as in the other types. Resolution was complete in some cases as early as the fourteenth day, the average, however, was the thirtieth day.

There was close agreement between clinical and radiologic findings when the consolidation was dense, but when it was patchy and hazy the physical signs were as inconclusive as in Type III infection. In 12 of the cases consolidation was hazy, while six showed more extensive radiologic signs of involvement than were suggested by clinical examination.

In some of this group resolution was extremely rapid. One patient, a man aged 20, who showed a crisis on the fourth day, had considerable enlargement of the hilar glands, and resolution was complete



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work? Also, are physicians, whether specialists in the subject or general practitioners, doing the right thing in forbidding patients to enter a trade in which dust of any kind is involved or are we inflicting an unnecessary hardship by telling a man he cannot go back to his old job to which he is accustomed and at which he can earn his living simply because he will inhale a certain amount of harmless dust?

From personal experience the author would answer these questions as follows

(1) He does not believe that exposure to harmless dusts in normal amounts and under normal conditions will reactivate an arrested or quiescent tuberculous process. He does believe, however, that dust in excessive amounts under abnormal conditions, such as street dust in winter and fall or germ-laden dust from sleeping cars, etc., which might well cause irritation and infection of the throat, trachea and bronchi, is a potential source of harm.

(2) He does not believe that dust which may cause allergic phenomena, such as asthma, asthmatic bronchitis or hay fever, will reactivate or harm a tuberculous process.

(3) As to allowing an arrested or quiescent tuberculous patient to take up a trade in which he would be exposed to a harmless dust, the author admits that, as a result of his study on this subject, he would be quite willing to allow his patients to take up such dusty work unless the conditions as to the dust were extremely bad.

CHARLES C MACKLIN, M.D. *The Dynamic Bronchial Tree* Am Rev Tuberculosis, 1932, XXV, 393-417

An attempt is made to visualize the *locus* of pulmonary tuberculosis. The purely conducting part of the bronchial tree (that is everything up to, and including, the fine, smooth-walled bronchioles) is envisaged as undergoing a lengthening with inspiration and a shortening with expiration, and the details of this process are explained with diagrams. The peculiar shape and mode of action of the pleural

cavity make it necessary to shift the lower part of the lung during inspiration in a downward, forward and outward direction, if the part above and behind the hilum is to expand properly. The root of the lung is of very great importance in this movement, of which the reverse phase is seen in expiration. It is suggested that the normal flexibility of the root may be impaired from disease processes, and that this will hamper lung ventilation, especially in that part lying above and behind the hilum. The advisability of ascertaining the normal range of movement in the root, particularly in children, is stressed, and the possible relation of interference with this movement to pulmonary tuberculosis advanced. (Author's abstract)

COOPER, A. T. Some observations as to the results of phrenic exeresis in pulmonary tuberculosis, *Annals of Internal Medicine* Vol 4 No 12, p 1569

Reporting 200 phrenicectomies performed at Fitzsimmons General Hospital (1922-1931), Cooper found that approximately 70% of those operated on the right side showed definite rise of the diaphragm and only 55% of those operated on the left side showed a definite rise. He points out, however, that the paralysis of the diaphragm decreases pulmonary ventilation and action, and improvement follows without the aid of a rise in the diaphragm (vertical compression) in many cases.

The operation is of value in many cases of pulmonary tuberculosis where the lesions are mainly unilateral. It is of special use where pneumothorax is impossible. A good rise in the diaphragm may ensue even in the presence of adhesions. Phrenic-exeresis is particularly indicated in unilateral cavitation involving the lower or central part of the lung. A tendency toward compression is noted in 42% of the cavities in mid-lung or base, while only 30% of the cavities higher in the lung than the central portion have been noted to be definitely benefited.

Phrenic-exeresis is useful as a preliminary step where complete thoracoplasty is contemplated, as sufficient collapse may be obtained with resection of fewer ribs and less deformity. Also it is useful as a preliminary procedure to test out the contralateral lung.

The operation frequently ameliorates much of the distressing and wracking cough present in far advanced cases and enables the sputum to be raised with less effort.

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CASE REPORTS*



*This page is devoted to Queries and Answers as well as Case Reports
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TRAUMATIC HEMO-THORAX

R H., age 21, American, family history negative Occupation, truck driver

Present history While driving a large truck had head-on collision with another truck, patient was thrown violently forward against steering gear, was picked up in severe state of shock and admitted to hospital within thirty minutes after the accident

Preliminary examination Patient in severe state of shock, blood pressure could not be determined, marked distention of abdomen Laboratory report showed urine to be normal *Blood Count Hemoglobin 60% Red cells 3,000,000 White cells 4,500* Tentative diagnosis, severe abdominal hemorrhage During the first 24 hours, patient's condition remained grave, however, during the next 24 hours, patient improved Improvement continued uninterruptedly for 10 days when he was seized with severe pain in lower left chest which was accompanied with temperature of 103 X-ray and fluoroscopic examination indicated the presence of fluid Aspiration was done and 50 c c of fluid was withdrawn, cultures of which were negative Patient's temperature remained 101 to 103, pain continued and numerous aspirations were done each time the amount of serous fluid growing less, until only 1 to 2 c c's could be secured At this time I was consulted

Physical examination of chest, showed marked dullness and absence of breath sounds in the lower lobe, left lung X-ray films showed marked haziness over the same area 50 c c's of Iodized Oil were injected into the pleural cavity at the site of former aspirations X-ray film following injection of iodized oil indicated a large collection of the Iodized Oil assum-

ing the shape of an hour-glass Diagnosis of hemo-thorax was made and the 9th rib resected in mid-axillary line and an immense blood-clot removed The remaining cavity was packed and patient returned to his room, that night he had a severe hemorrhage into the pleural cavity, blood transfusion was done and repeated on 3 occasions The packing then was removed very slowly from day to day and during the next few weeks the patient's recovery was slow, but at this time he is fully recovered

Remarks The patient's grave condition at time of admission to hospital was unquestionably due to shock and hemorrhage His subsequent improvement for 10 days was due to the fact that the hemorrhage in the pleural cavity was controlled by pressure and the blood clot Evidently the severe pain in the side and the sharp rise in fever was due to absorption of the partially decomposed blood clot The small amount of serous fluid was simply blood serum, resulting residue from the organized blood clot

EVERY THOUGHTFUL physician in every line of medical work may well pause frequently these days and meditate upon the changing trends of medicine It is necessary that he free himself, so far as possible, from the traditions of the past, the local customs of his area, and the limitations with which his professional habit of mind has subjected him by its routine It is easy to see an evolution that has nearly ended It is difficult to see an evolution in its beginning or before its direction is well established No doubt the next generation will be beset with profound social and economic changes that will uproot the traditions of the past and the customs of the present

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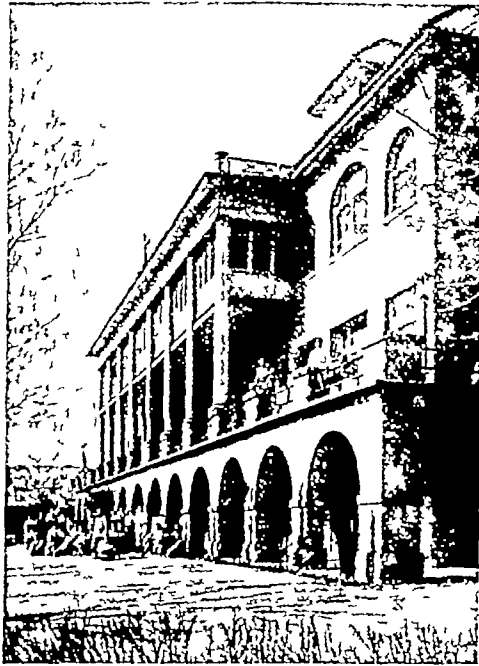
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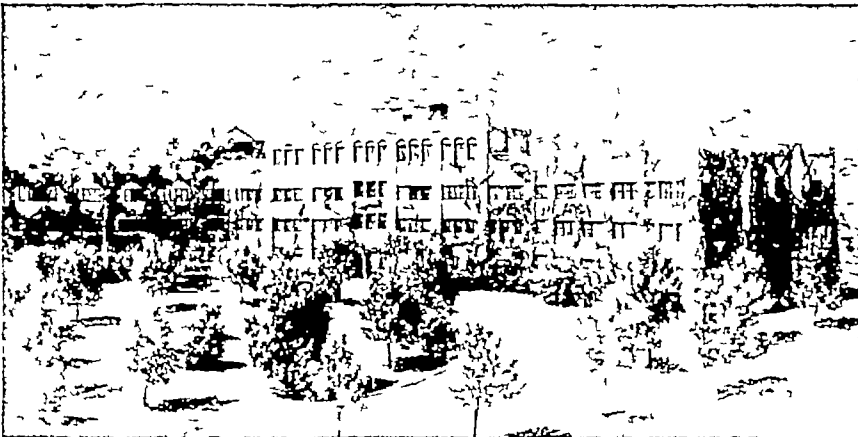
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C M HENDRICKS EDITOR IN CHIEF

(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind"

Lawrason Brown, M D

Editorial Comment

Editor's Note IT IS NOT the policy of DISEASES OF THE CHEST to publish articles on tuberculosis written by the laity, but the article entitled "Stop! Rest!" by John Chapman Hilder which appeared in the September issue of the *Good Housekeeping Magazine* so vividly portrays the reaction of the patient toward the physician and also the feeling of the patient toward the sanatorium that we have made an exception to our editorial policy in this instance

The regrettable part of Mr Hilder's story is that the facts enumerated are not only true in Mr Hilder's case but are evident in thousands of cases in sanatoria thruout the country

DISEASES OF THE CHEST is published monthly to assist you to make such stories as "Stop! Rest!" unnecessary M K

Education in Tuberculosis WITH THE ADVENT of December, when we think tuberculosis we think of the educational program of the National Tuberculosis Association made possible by the annual seal sale This educational program for twenty-five years has carried to the laymen the story of tuberculosis, the contagion, and how to prevent it Education of the public in tuberculosis has done a great deal towards reducing the death rate from tuberculosis in the United States from first to seventh place

There is much for the medical profession to ponder over when we consider education in tuberculosis When the National Tuberculosis Association and its component societies carry to the public an educational curriculum in tuberculosis, it is in fact an admission that the medical profession has been unable to adequately cope with the tuberculosis problem and that the people, themselves, must be trained and counselled in such known processes as may tend to reduce the incidence of this great infection The education of the public has proved inadequate to meet the tuberculosis problem More education is necessary if we are to reduce this major infection from its present stronghold

It would seem that the education of the future should not be so much the education of the layman but of the physicians themselves And it is not necessary that physicians be educated in some new discovery but rather that there be assembled and correlated the present classical facts that we have actually in our possession today, but facts that we are not utilizing to the fullest degree possible for the professional management of this disease

There are two groups of us that should be educated in tuberculosis The first group is composed of bedside physicians, those general practitioners and internists who are called to the acute case It is known to the profession that the tubercle

bacillus may be responsible for the acute pulmonary illness, most frequently diagnosed as broncho-pneumonia. How many physicians are tuberculosis conscious to the degree that when they are called to the bed-side of an acute pulmonary illness that they have in mind the causative factor might be the tubercle bacillus? How many physicians have their patient x-rayed six weeks following the "broncho-pneumonia" or "influenza" because they realize that the acute illness might have been due to the tubercle bacillus and the case should be investigated weeks later to ascertain whether or not resolution has occurred? What a great contribution it would be towards the tuberculosis problem if the educational program carried to the bed-side doctors of the United States, tuberculosis consciousness for the attempted diagnosis of the acute pulmonary case presenting

The other great group of physicians who need education are those physicians who treat pulmonary tuberculosis. These physicians know the value of hospitalization, the value of bedrest together with other hygienic measures, they are versed in the various methods of pulmonary compression, but they have insufficiently correlated their methods of treatment and regimented them, if you please, to that state where they are living under the slogan "Open tuberculosis must be closed"

Again it is a case of carrying to a group of physicians facts already known to us but when correlated lead us to a state of consciousness that when we have an open case of pulmonary tuberculosis presenting that our entire effort should be to close it

Our imagination might carry us to great heights if we thought of the results that could be obtained if the bed-side physician made a truly early diagnosis of tuberculosis in its truly first clinical stage. And then our imagination would carry us into the realm of the millennium when we think of the results that would be obtained towards the control of this infection if all of our men treating tuberculosis operated

under the slogan that "Open Tuberculosis Must Be Closed". And to accomplish these two great results we need no new information. We have adequate proven facts to accomplish both of these ends, if we will but disseminate them properly to those two great groups of our profession.

So as the National Tuberculosis Association launches its drive for education of the public in tuberculosis for 1936, should we not hang our heads at least far enough forward to ponder, if not to hang our heads in shame. We have not carried the proper education of tuberculosis to our very own profession. May 1936 bring more education in tuberculosis, not so much to the public but to the physicians themselves.

O E E

A Section on Diseases of the Chest at A M A AT A RECENT meeting of the Southwestern Medical Association the following resolution was voted favorably

"Whereas, pulmonary tuberculosis remains one of the greatest causes of death in this country, accounting for the loss of 59.5 lives per 100,000 population in 1933, and

Whereas, this economic depression has caused conditions of poverty, exposure, etc. which are conducive to an increase in the incidence of this disease, and

Whereas, there are entirely too few medical colleges which have departments devoted exclusively to teaching diagnosis and treatment of diseases of the chest, and

Whereas, adequate post graduate instruction in diagnosis and treatment of tuberculosis is available only to a select few, and

Whereas, the program of the National Tuberculosis Association stresses largely the sociological rather than the medical aspect of tuberculosis,

Be it Therefore Resolved, that the Southwestern Medical Association go on record as favoring the establishment of a section on Diseases of the Chest at the Annual Meeting of the American Medical Association, and

Be it Further Resolved, that the secre-

tary of this Association be instructed to send a copy of this resolution to the President and Secretary of the American Medical Association and to the Editor of the Journal of the American Medical Association."

This resolution needs little comment. That there is a crying need for more opportunities for the general practitioner to receive instruction in the diagnosis and treatment of tuberculosis and other chest ailments cannot be denied. These physicians must now depend upon occasional articles in various medical journals for their information concerning recent advances in diagnosis and therapy of these diseases. Medical journals devoted entirely to this specialty are, in most cases, beyond the financial reach of the average doctor. This is the principal reason for the publication of this magazine, *DISEASES OF THE CHEST*.

The meetings of the National Tuberculosis Association are attended largely by specialists in this disease and, therefore, offer little to the man who is able to go to only one or two meetings a year. The sociological program of the National Tuberculosis Association is by no means condemned. As a health measure it is excellent, but as a method of helping physicians in general practice learn more about these diseases it is relatively weak.

Every doctor should be interested in the establishment of this section at the American Medical Association Meeting. *DISEASES OF THE CHEST* strongly urges such action.

R B H, JR

Pulmonary Hemorrhage IT IS WELL known that hemostasis may occur at any time during the course of pulmonary tuberculosis. It may, apparently, occur without regard to the extent or nature of the morbid pulmonary change. Its development is entirely independent of subjective symptoms or physical signs. It may occur in the absence of fever, cough, emaciation, pulmonary excavation and recognized cardiac or circulatory disturbance. Even in the midst of seeming health and vigor alarming

hemorrhages often occur, copious loss of blood, suggesting a possibility of a ruptured aneurism. On the other hand many patients are permitted to linger for years without hemorrhagic experience, although the lungs are known to have undergone very extensive destructive changes.

Various observers have reported the proportion of pulmonary invalids suffering from hemorrhage to be from 20 to 80%. In considering such diverse percentages, due allowance must be made for the vitally different conditions under which the respective groups of patients are observed. It is easy to understand why hemorrhages should be decidedly more frequent among the invalids who are not subject to disciplinary control than among those confined within closed sanatoria. The striking disparity recorded as to the frequency of hemorrhages within and without sanatoria has been asserted to be incident purely to the supervisory regimen practiced in such institutions.

C M H

Fever FEVER, by virtue of its overwhelming prognostic significance, surpasses in importance all other symptoms of pulmonary tuberculosis. Persisting elevation of temperature furnishes more reliable evidence upon which to base unfavorable conclusions regarding the ultimate success than any other clinical feature in the course of pulmonary tuberculosis. The continuous fever is an insuperable obstacle to recovery. The development of fever is known to be entirely independent of the physical signs, the stage of the disease, or the nature and extent of the pathologic process. Most extensive areas of active tuberculous infection may exist without any appreciable elevation of temperature.

Rest, both physical and mental, is absolutely necessary if an effort to control continuous fever is to be accomplished. The maintenance of bed rest continuously during the 24 hours in the day is often attended with remarkable results even in far advanced cases.

C M H

Present Day Conception of Renal Tuberculosis*

IT MAY BE WELL to state briefly the facts that are known at present relative to renal tuberculosis. It is

BY
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Denver, Colorado

important that the general medical profession should be kept informed of the progress that has been made in this field, for in no class of urological cases can the general practitioner be of greater service than in the management of cases of tuberculosis. Exhaustive studies have been carried out during the past ten years which have somewhat modified our views of renal tuberculosis.

It is now generally accepted that renal tuberculosis is always a secondary lesion. It is usually a blood-borne infection. The respiratory system is most frequently the original focus, nodes in the hilum giving off bacilli which enter the blood stream through the lymphatic duct, the final lodging place of the bacilli setting up a disease process depending largely upon local resistance and the number and virulence of the organisms present. Multiple lesions, such as in bones, joints, and kidney, seem to be simultaneous infections.

It is thus seen that both kidneys are subjected simultaneously and equally to the possibility of a tuberculous infection. Aside from the lowering of resistance in one kidney, possibly due to traumatic injury or some interference with kidney drainage, each kidney is quite as liable to infection as its fellow. Also, when genital tuberculosis is the origin, thence to the trigone of the bladder, both kidneys may be involved by direct ascension along the ureters. With both kidneys exposed simultaneously to infection, there is reason to believe that in probably a large proportion of cases, the earliest lesions of renal tuberculosis are bilateral, also that these earliest lesions are non-destructive in character and frequently heal.

Unilateral renal tuberculosis may also

originate by extension into the kidney of a tuberculous disease from a nearby organ. Infection by extension

can come from the nearby intestinal tract, from the para-aortic glands, from the vertebral bodies or from the adrenals. Thus it is seen that tuberculosis of the kidney may originate as a unilateral or bilateral infection.

Studies by pathologists and urologists, notably Thomas and Kinsella, connected with sanatoria, where large numbers of cases of general tuberculosis are under observation for periods of years have shown that the only finding in very early cases of renal tuberculosis may be the discovery of tubercle bacilli in the urine, that the presence of tubercle bacilli in the urine denotes renal involvement, and that probably seventy per cent of the cases of renal tuberculosis are at first bilateral, also that the very early non-destructive kidney lesions sometimes heal.

The examination, by Medlar of 100,000 serial sections of the kidneys in thirty patients who had died of advanced pulmonary tuberculosis, but who had not had clinical symptoms of renal involvement, showed in twenty-two cases, that renal tuberculosis was present and in every case in which both kidneys were examined the disease was bilateral. In addition he also found scars representing healed lesions in seventeen of the cases.

In the earliest cases of renal involvement, the symptoms are masked. Probably the majority of the earliest renal lesions are in the cortex, being found in the glomeruli or in the tissues between the tubules. Until such lesions ulcerate into a collecting tubule, tubercle bacilli will not be found in the urine. These discrete lesions may heal in one kidney, while they become advanced in its fellow. The lesions may ulcerate into a collecting tubule, when tubercle bacilli will be found in the urine.

*From the Urological Service of The Jewish Consumptives Relief Society.

The infected urine may now cause lesions to develop in the less resistant tissue of a renal papilla where ulceration at once takes place into a calyx setting free blood, pus cells, and tubercle bacilli in the urine, giving rise to all the clinical manifestations of renal tuberculosis. The picture then presented is the one most often seen by the urologist, i.e., that of unilateral destructive renal tuberculosis. Such an understanding of the pathological process offers some explanation for the common delay in establishing an early diagnosis of renal tuberculosis, and also its apparently unilateral character.

Types of Renal Tuberculosis

We should distinguish clearly the several types of renal tuberculosis, of which, from the practical point of view, there are three definite, essential groups.

The first group comprises renal disorders which may or may not be due to activities of the tubercle bacillus within the renal substance. The majority of these cases have undiagnosable renal cortical lesions. Such cortical lesions may effect communication with a tubule and in this manner tubercle bacilli gain entrance to the excretory channels and may be found in the urine. As stated before, it is the modern point of view that tubercle bacilluria is an indication of a renal lesion and does not occur as the result of excretion of tubercle bacilli from the blood by the healthy kidney. In the absence of advanced renal destruction as evidenced by complete study we would not advise operation in cases of this kind even though bacilluria were persistent and unilateral.

A second group, comprising the unilateral ulcero-cavernous form of renal tuberculosis, are definitely surgical.

The third group comprises the advanced bilateral type for which surgery is unavailable. Bilateral cases should not be operated upon unless one kidney demands removal for reasons other than the presence of tuberculosis, that is, for complications such as pain, hemorrhage or severe mixed infection giving rise to profound toxemia.

Prognosis in Non-Operative Cases

Remberg reports spontaneous arrest of renal tuberculosis in 1 of 213 cases and Wildbolz analyses a series of 316 non-operative cases of which 218 died, 99 of them within two years of the onset of the disease, and of the 98 survivors 68 still suffered severe bladder symptoms, in the remaining 30 these symptoms had gradually diminished and the patients were comparatively comfortable. This did not necessarily mean that the disease was cured, or was becoming cured. Fatalities usually result from intra-urinary dissemination of the infection, a fact which supports the prevailing surgical opinion, namely, that renal tuberculosis is a progressive disease eventually destructive to life in the majority of cases. Fortunately, the progress of the disease is often slow and usually from the standpoint of clinical or diagnostic features, at least, primarily unilateral.

Prognosis Following Surgical Treatment

The average results obtained by the surgical treatment of urinary tuberculosis are as follows: Operative mortality, 5 per cent, late mortality, 15-20 per cent, permanent cure, 50 per cent. The remaining patients usually live for many years, although they harbor foci of active tuberculosis.

Symptomatology of Clinical Renal Tuberculosis

The picture of clinical renal tuberculosis may be quite varied. Patients seek assistance at a comparatively late stage of the disease. This is true because of the usual insidiousness of the onset and the fact that the early symptoms are not alarming. The primary symptoms in the majority of cases originate from the bladder—frequency, urgency and burning on urination. Pain referable to the kidney is also a very frequent complaint. This pain is usually dull or aching in character and sometimes only a feeling of heaviness. Hematuria may frequently be the presenting symptom. There is usually a characteristic pyuria in an acid urine.

Diagnosis

Space does not permit of dealing minutely with the various phases of urological examination for these particular cases, but cystoscopy, ureteral catheterization, as well as pyelography and cystography have so brought to perfection our armamentarium that present day diagnosis is almost a positive conclusion.

Our aim is not merely to determine that tuberculosis of the urinary tract exists but to ascertain exactly where the infection is and to what extent destruction has occurred. It is with this in mind that patients are subjected to a thorough routine examination and complete cystoscopy.

Patients with genital tuberculosis should always have a most thorough examination to establish the possible coexistence of renal tuberculosis, such a complication occurring much more frequently than has been recognized.

Incidence

The age incidence of renal tuberculosis is between twenty and fifty, with a few cases before or after that period. Males have been said to be more susceptible than females.

During the past decade a marked diminution in the incidence of tuberculosis in general has been accompanied by a diminution in the incidence of urinary tuberculosis.

Treatment

So-called pre-clinical tuberculosis should be treated medically. If no real destruction has taken place, the patient should have the benefit of careful medical care, placed in a sanatorium where he may have the advantage of supportive hygienic treatment and heliotherapy.

If a destructive lesion supervenes during medical treatment or, as happens more often, the case on presenting himself usually shows a destructive lesion, surgical measures should be instituted.

Destructive unilateral renal tuberculosis is always surgical, and nephrectomy should be performed, unless the patient's general condition contra-indicates surgery. The body has the power of develop-

ing (through general hygienic measures aided by heliotherapy) a decided resistance to the action of the tubercle bacillus, such resistance should be encouraged and raised to a maximum before surgical measures are employed.

Anaesthesia

Spinal anaesthesia is the anaesthetic of choice for nephrectomy, especially in renal tuberculosis.

Surgical Procedure

The kidney with as much of the ureter as possible is removed through the usual lumbar hockey incision by means of the electro-surgical knife. This method gives a better chance for primary healing of the wound.

Postoperative Treatment

The healing of operative wounds and of bladder and ureteral lesions will take place in direct proportion to the general resistance of the patient.

Wang has made some valuable contributions to the treatment of postoperative tuberculosis of the urinary tract. Rest, fresh air, quartz light, tuberculin and medical therapy are employed.

In the majority of cases vesical lesions heal without further treatment after the kidney has been removed.

Remarks

At the time when active symptoms of renal tuberculosis are manifest and such patients come under the observation of the urologist, destructive lesions are present, and if the disease is unilateral, nephrectomy is indicated. But, does not future progress lie in the discovery of the earliest lesions, before destructive changes have taken place and the disease has become disseminated throughout the urinary and genital tracts? Is it not possible that if those who care for cases of pulmonary, as well as other types of general tuberculosis, regularly searched the urine for the presence of tubercle bacilli, and made guinea pig inoculations, that occasional very early cases of renal tuberculosis would be detected? If the earliest lesions

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The Diagnosis Problem in Pulmonary Tuberculosis

METHODS for diagnosing pulmonary tuberculosis have been so standardized in the past

BY
WILLIAM C. VOORSANGER, M.D. *
Los Gatos, California

few years that the general practitioner should readily detect an early lesion. Certain criteria have been set up and emphasized, such as fatigue over a period of time, a history of one or more attacks of pleurisy particularly if accompanied by effusion, cough, loss of weight and hemorrhage. A preponderance of any of these symptoms should at least indicate a strong probability of tuberculosis. If added to a majority of these symptoms we have fever, particularly afternoon rise, plus night sweats the diagnosis becomes more sure. To clinch it we take an x-ray picture for corroboration. Finally we examine the sputum which, if containing tubercle bacilli, makes the diagnosis certain.

If the above simple criteria are kept in mind and found in a patient it does not seem possible to miss a case of pulmonary tuberculosis. And still we find sad blunders repeatedly made both on the part of the general practitioner and the chest specialist. The latter often blunders the wrong way, diagnosing tuberculosis without positive criteria instead of giving the patient the benefit of the doubt. To illustrate—recently a patient after taking ill with high fever, cough, expectoration and pleurisy was diagnosed as serious tuberculosis because the chest consultant heard dry rales over the left apex. The x-ray showed a dense shadow above and below the clavicle. The sputum however was negative to tubercle bacilli. The patient was sent to the sanitarium with a guarded prognosis. In five weeks she was perfectly well. She had an apical pneumonia.

How often do we receive lung malignancies with roentgen diagnosis of tuberculosis. A simple rule and an old one to follow is "never to diagnose tuberculosis

positively from x-ray shadows if the sputum is negative." Suspect it always, but think of other

possibilities. Basal lesions though often tuberculous are often something else if the sputum does not contain tubercle bacilli. Of course I am not discussing healed lesions nor thickened pleura in x-ray pictures. I refer to lesions with clinical symptoms.

Failures to diagnose tuberculosis are getting less common but failure to diagnose the degree of tuberculosis present is still prevalent and fraught with serious results to the patient. It is not sufficient to make a diagnosis of minimal tuberculosis unless the patient is put to bed and strictly observed with frequent roentgenograms. The beginning lesion of today if exudative in character may be widespread in a month. Again to illustrate two rather unfortunate incidents. A young married woman was diagnosed as beginning pulmonary tuberculosis in January. She was not put to bed until March and in April came to the sanitarium. The January x-ray showed a small lesion under the left clavicle, the April x-ray showed dissemination with cavity formation in both lungs. An attempted bilateral pneumothorax was unsuccessful. If in January the correct diagnosis had been made, that is, acute exudative lesion, and pneumothorax induced when the contralateral lung was still uninvolved, this patient would in all probability be alive and well today.

I have a patient whose x-ray ten months ago showed a small central lesion in the left lung. She was treated at home by a supposedly careful physician and after a couple of months allowed exercise. In all the ten months no control by x-ray was exercised. The patient losing weight, was sent to the sanitarium where an x-ray showed extensive involvement in both lungs. The original x-ray picture is evidence that a pneumothorax could have been easily performed on the left lung and

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thus have prevented in all probability infection to the right. It now becomes necessary to perform bilateral pneumothorax with slim chances of a result. The error in the above two cases will be attributed by many to incorrect treatment. I attribute it to incorrect diagnosis and careless subsequent observation. Naturally, correct diagnosis and treatment go hand in hand. The latter fails if the former is faulty.

Perhaps our classification is wrong or let us say in the light of present knowledge it should be amended. According to the National Tuberculosis Association classification, cavity means advanced tuberculosis. Still, acute exudative tuberculosis may begin with a cavity which will disappear under careful bed rest or under prompt pneumothorax. Again, a so-called minimal or beginning lesion unless recognized as inflammatory may rapidly spread. Advanced tuberculosis should apply to old or fairly old fibrotic or thick-walled cavities, not to acute thin-rimmed ones. Perhaps with more care in observing clinical symptoms and history, the constant taking and meticulous interpretation of blood findings and sedimentation tests, and the repeated study of sputum, paying attention to number of bacilli and their character, we will be able through association to better interpret x-ray shadows as exudative, infiltrative or fibrotic. Naturally a short paper of this character will not permit delving into the nature of infection. Suffice it to say the toxins of any germ act differently on different soil and no one knows the real reason why the same bacillus causes rapid destruction in one individual and not in another.

Tuberculosis is still a leading cause of death between ages fifteen and thirty in spite of the fact that the general death rate for disease places it seventh on the list. In all our preventive work today we should concentrate on this young class and attempt to diagnose the disease early because it has been definitely proven that 75% of all patients when first seen by a physician are amenable to some form of collapse therapy. The statement of years ago still holds, namely, that over 80% of minimal tuberculosis can be arrested and

the patient restored to his place in society. If this be true then a great responsibility is placed upon the physician to properly diagnose his patient. He must not rely upon any one method. He cannot always depend upon physical signs because percussion and auscultation may be absolutely negative in the presence of a well defined x-ray lesion. A situation I always consider most serious for the patient is the presence of a small lesion upon the x-ray picture with no lung dullness and practically normal breath sounds but a definite history of tuberculosis extending over a few weeks with some cough, fairly high afternoon fever and occasional night sweats. This is the picture of an inflammatory lesion.

These are the symptoms in embolic pneumonia of which in recent weeks I have seen several cases. The patient is quite ill but physical diagnosis gives no hint of his trouble. The x-ray picture, however, will show a small consolidation under a clavicle or a peculiar looking excavation almost like a cavity at the base or in the center of the lung. The blood picture will often differentiate the condition from exudative tuberculosis if the sputum is negative to acid fast bacilli or, as is often the case, there is no sputum obtainable. In the strictly embolic pneumonia we have a high white count, 20,000—25,000 with a preponderance of neutrophils. This type of pneumonia may eventuate into an acute form of tuberculosis and therefore when the diagnosis is made the patient should be kept in bed for several weeks after temperature is normal. These patients simulate tuberculosis because they lose a great deal of weight during their illness.

The above few brief reflections attempt to call the profession's attention to a definite problem which still exists in the diagnosis of pulmonary tuberculosis, particularly the acute inflammatory forms. It behooves us all to try at least to place a beginning pulmonary tuberculosis in its proper class or type. If doubt exists, safety demands that the patient be kept at absolute rest in bed under careful clinical and x-ray observation. Only in this way may we avoid the responsibility of all too many unnecessary deaths, especially in young patients.

Empyema in Infants and Children

INFLAMMATION OF THE

PLEURA is a very common affection and manifests itself as a primary or secondary process. Until recent years pleurisy as a primary condition was regarded as a frequent occurrence, but in the light of present day knowledge by far the large majority of instances of inflammatory pleural lesions are secondary to some pre-existing condition. Primary pleurisy with effusion may result, however, in tuberculous infections and in traumatic injury to the chest wall.

Empyema must be regarded as a type of pleurisy, but due to certain pathological peculiarities of the condition it is usually considered as a distinct entity. In infants and children primary empyema or pleurisy with effusion is a very rare occurrence, and in a great majority of the cases pus in the pleural cavity is the result of a pre-existing lobar or broncho-pneumonia. The pneumococcus is the most frequent organism found on smear and in culture, being the exciting factor in about seventy-five percent of the cases. The streptococcus is the next most frequent offender, being followed by the staphylococcus, influenza bacillus and other organisms common to the respiratory system.

Post mortem pathological studies have shown conclusively that pneumonic lesions in infants and children differ greatly from those found in adults. In lobar pneumonia all stages of the pneumonic process from congestion and red hepatization to resolution may be found in one small circumscribed area and in practically all specimens evidence of bleb formation at the periphery of an involved portion is found. This bleb formation may be microscopic or macroscopic and in all probability empyema in these cases is due to rupture of these blebs, or the resulting irritation of the adjacent pleural covering of the lung.

The anatomical structure of the infant and childhood chest is such that effusions, either transudative or exudative, do not

BY

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Atlanta, Georgia

early gravitate to the dependent portion of the chest. These effusions seem to follow the lung margins

and tend to become inter-lobar early in the condition, and it is not until several days have passed that the effusion gravitates to the base of the affected side. This fact brings up the question of when to evacuate an effusion and how should it be done.

In years past the children's wards of hospitals were cluttered up with so-called chronic empyemas. The tragic picture of emaciation and deformity which these patients depicted is one that is now seldom seen. Advances in technique and diagnosis have been great and it is due to these advances that a more rational method of treatment is now used in these cases.

In following a case of lobar or broncho-pneumonia, empyema should always be regarded as a possible complication. Daily chest examinations should be done and any change in breath sounds, palpation signs and percussion tones noted. The fever chart should be of great diagnostic importance, especially if correlated with the chest findings. If empyema is suspected early and if there is not a great deal of respiratory or cardiac embarrassment a few hours may pass before any procedure is attempted. This elapse of time permits fixing of the mediastinum and precludes the possibility of sudden shock due to removal of fluid from the chest.

The diagnosis of empyema definitely made leaves but one alternative, and that is drainage. Empyema should always be dealt with as an abscess cavity and as such evacuation is the only method of treatment. In recent months much work has been done on the type of drainage to be used, and this merits further discussion.

In the past it has been dogmatically stated that as soon as empyema has been diagnosed open drainage should be re-

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Rehabilitation at Altro Workshops

THE PATIENTS of the Altro Workshops had a party June 1st to celebrate the completion of twenty

BY
EDWARD HOCHHAUSER*
New York, N Y

Hygiene of the New York City Department of Health and her slogan that "public health is purchasable"

years work. In their letter to the staff, the chairman of the patients' organization wrote "we have unanimously adopted a resolution wherein be extended to you their sincere congratulations in recognition of the commendable manner in which you have carried on a work so outstanding in the field of social rehabilitation and wish you continued success in attaining the ultimate purpose in the task to which you so resolutely set yourselves"

In the prevention, and perhaps more so in the treatment of the tuberculous, we are dealing with a complex situation in which medicine is interwoven with sociology, economics and psychology

This was brought home to us in the experiment that led to the starting of the Altro Workshops in New York City. A study of graduates of Bedford Hill Sanatorium, the country branch of Montefiore Hospital, disclosed a very high percentage of relapses among patients discharged as improved or better. Within six to eighteen months after sanatorium care the "good prospects" showed a loss of over 50% due to death or relapse. Another study of patients from Otisville, a municipal sanatorium, disclosed similar results.

Twenty years is not long in the life of institutions, but it has seen a radical change in the social care of the tuberculous, and the conception of the possibility of *rehabilitation*, and in the treatment of the patient. The public attitude was formerly one of fear and its primary, almost sole interest, was to protect itself. The worker in the tuberculosis movement, doctors, nurses, lay and social workers, were affected by the fears they helped to develop, and our medical and social treatment was built upon a series of Don'ts.

A three year experiment, started in December 1913, sought to answer two questions. Is it possible to reduce this high rate of relapse? Can the tuberculous be rehabilitated socially as well as physically?

Very early in the experiment it was found that medical and social care, as important as they are in the care of patients after sanatorium, did not meet the needs of the group who on discharge from the sanatorium were unable to work full day in normal industry.

Fear on the part of the patient is one of the greatest handicaps in the community fight against tuberculosis. In rehabilitation the mental problems are often more difficult to cope with than the physical problems incidental to his disease. After months and often years of invalidism, long periods of institutionalization with its compulsory regime of rest and relief from all responsibility, many factors remain to challenge all our resources.

Many patients discharged from the sanatorium make a sufficient recovery to enable them to return to a full-time job. Sometimes an interested employer makes the return easy. The wage earner, with moderate or advanced tuberculosis, whose disease has been improved or has reached a condition of apparent arrest, but whose work capacity is limited, presents the greatest problem. For many patients there is a wide gap between sanatorium treatment and normal industry.

Slowly we are building a positive philosophy in our dealings with patients and their families. This has probably been influenced by the experience which has demonstrated that many patients can get better, that relapses can be reduced and families returned to a self-sustaining level.

Some of us may remember Dr. Josephine Baker of the Division of Child

Once tuberculous always an invalid and usually chronically dependent, is the uninformed opinion of most people, while at

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the other extreme we have a placement office in a large Canadian city which was reported to have said that the tuberculous patients present no problem to social workers because they do not find this disease a handicap in placing patients

To meet the needs for industrial care in addition to medical and social care of the tuberculous, the Altro Workshops were started in June 1915. Industrial convalescence, a scheme of graduated work under medical supervision, carries the patient from a three-hour day to a full day. Productive work is provided with working conditions and pay comparable to industry. Work and rest is on an individual basis prescribed on periodic examination. It is a hardening process and preparation for work in industry.

In physical surroundings as well as in method, an attempt is made to stimulate the conditions of normal industry. While we appreciate his handicaps, we always try to keep before the patient as his ultimate goal liberation from charitable relief and medical care. It is often difficult to make the patient understand the philosophy of the workshop. After spending six months to two years with institutional treatment and depending on charitable assistance for the necessities of himself and his family, the patient is interested in wages if he is at all ready to return to work.

Work is a recognized therapeutic agent for the reconstruction of mind and body. The realization brought to the patient that he is not destined for the scrap heap is often more potent than the medication prescribed for him. While faith is an essential element in the cure, the patient cannot get well on faith alone.

As part of the social care at the Altro, the family is assured the necessary minimum income. When relatives are not in a position to assist, the patient receives the necessary minimum in his pay envelope. This minimum is made up of earnings and a subsidy. Pay is on a task basis and never less than the best or union wage for similar work.

The patient is said to be responding

satisfactorily if in the course of time his hours of work increase, which indicates improvement in his physical condition, and his earnings increase, which means greater efficiency and application.

The success of the Altro was predicated on its ability to dispose of its output. The equipment, modern throughout, with live steam pressing and many labor-saving and fatigue-reducing features, is similar to that found in many factories. Uniform making which includes all kinds of washable garments for use in hospitals, hotels, industrial plants, etc., was chosen because approximately half of the patients applying for care had come from some branch of the needle trade. The workshop was neither organized nor planned as a training school. The practice is to follow the method that enables the patient to earn quickly and to increase his earnings while working. The newcomer begins to earn the second day, and when he regains his health he may return to his old trade or be considered for vocational training or retraining. Exceptions are made where a patient is interested in the garment trade or has special aptitudes and would like to continue at this trade after graduating from the Altro.

In 1915 most physicians were skeptical as to the possibilities of the tuberculous being able to work indoors and particularly at such sedentary work as sewing. (Even then the fable about light outdoor work had been exposed. As one critic put it, the only light part of most of the jobs is the pay.) In addition to the doctor who warned us against hemorrhages and worse, there was the successful manufacturer who assured us that patients who had warmed steamer chairs for many months or even years could not turn out saleable standard merchandise, and patients who had received charitable assistance for a period of time would not want to work. In the administration of subsidy to wages, we recognized that human nature may be weak, that in addition to the spiritual and physical values of our scheme there must be an economic urge. The budget on which the subsidy was based

was more generous than the relief allowance of any charitable agency. As the patient's earnings increased he was permitted to retain part of this increase so that he found it paid to earn. With most patients it was put on a higher plane. The community was providing a minimum wage because they believed the patient was trying to get well and thereby save the cost of further hospitalization. As they earned more and required less subsidy they freed money for the care of other patients, and indirectly were contributing toward others. Just as the medical treatment and prescription of hours of work were on an individual basis, the social treatment varies depending upon the patient, his personality, intelligence and background, and our skill in securing his cooperation. Some patients make an effort to increase their earnings only as the subsidy is reduced or discontinued. Considerable care was exercised so as not to bring undue pressure. The patient's physical condition, his progress at the workshop, and the factory manager's report on patient's efforts and reasonable expectation as to earnings are all considered. Under no conditions are patients permitted to work more hours than prescribed by the medical examiner.

The workshop in its twenty years has operated on a five day week, the maximum hours no higher than that of the best shop in the industry. This was nine hours first, later eight hours a day and since the N. R. A. practically seven hours a day or 36 hours a week. Every patient spends the full working day at the workshop. He rests before lunch, he works again from two o'clock until 3.30 and then rests until dismissal time. As his condition improves and working hours are increased, the rest periods are reduced until he is working a full day. After working a full day he is considered for graduation into industry after review by the Medical Committee. If they concur with the medical examiner who is present at the examination by the members of the Medical Committee, the patient is then advised that he is ready for

return to normal industry. Some patients are ready for placement and the problem is one of getting a job. Others are referred for retraining or even further training at their old jobs. The State Bureau of Rehabilitation has been extremely cooperative in providing this training. After retraining they are ready for placement. During the last few years placement in jobs has been extremely difficult and many have had to secure public relief.

Because of limited facilities, patients with fair or good prognosis are given preference. Otherwise there would be a very small turnover, and with a daily average of 130 patients, very few new patients would be admitted. Ninety per cent are patients who on admission are rehabilitative cases and in the opinion of the medical examiner will be able to graduate in from one to three years. Ten per cent are permanent sheltered cases.

There are a large number of patients in need of permanent sheltered employment, who, because of extensive tuberculosis or other disabling diseases which limit their productivity, cannot return to normal industry but can work part time, often up to seven hours a day, in a sheltered workshop.

When the new workshop was built in 1924 it was planned so that another story and a half could be added to care for an increasing number of these permanent sheltered patients. This has had to be postponed for lack of funds. Many of these patients are prematurely condemned to the scrap heap. At home they are a drag on the family, often not welcome. At the hospital they are a nuisance, or at best occupying a bed needed for the acutely ill patient. They just don't belong.

The demonstration of the Altio Workshops is significant because the fundamentals of care can be applied to those suffering from other chronic diseases and the lesson is valuable also for the large industries. Not only can relapses be cut down radically, but these men and women can be made partially, or completely self supporting.

Stop! Rest!

TWENTY-FOUR months ago, as this is written, I enrolled in an institution of learning dedicated to teaching its student body, literally, how to live. Unlike other schools, it discourages mental activity and serious study. It sets no definite time for the completion of its course, but it holds, in general, that the most conscientious loafer shall make the swiftest progress toward graduation.

Not only does it applaud mental laziness, but it absolutely taboos athletics, and regulates strictly the physical exercise taken by its students. The well-kept campus, with its fine pines and spruces, maples, magnolias, and elms, boasts no stadium, no baseball diamond, cinder track, swimming pool, tennis courts—nor even a set of clock golf. Slow walking, in fact, is the only outdoor sport allowed by the authorities. The school motto (a cheer being out of the question) is "Take it easy." For, to make a mystery of it no longer, the institution is a sanatorium for the treatment of tuberculosis.

To say that this school teaches one how to live is merely to state the bald fact. Take its lessons to heart, and you may and probably will go on living, barring unforeseen complications, treat them lightly, and you certainly will not.

Had I known years ago what I have learned since entering the institution, I should perhaps never have needed to enter it. But how many normally healthy people do know anything about tuberculosis, unless they have been related by blood or friendship to some one afflicted with it? To me it was one of those diseases other people get. The possibility of developing it myself did not enter my head. I had a vague notion that it was a slum sickness. As to how a person contracted it, or why, or what its symptoms were, I was in utter ignorance.

Some people remarked that it seemed strange that a big, strong (one even added handsome) man like me should get tuber-

BY
JOHN CHAPMAN HILDER
In *'Good Housekeeping'*

culosis. But I have learned that the bugs are no respecters of a man's size or muscular equipment, nor are they impressed by his social or economic status. A large proportion of my fellow students stand over six feet tall. Among them have been truck drivers, university professors, plumbers, advertising men, lawyers, physical directors, stockbrokers, chain-store clerks, furniture salesmen, college youths, high-school boys, tool-makers, rich men's sons, silver buffers, doctors, and what-are-you. Eugene O'Neill is an alumnus, so is Albie Booth. To develop an active case of tuberculosis, regardless of your size and muscle, all you need do is to become so run down that your resistance loses its potency against germs. In that condition you are fair game for any voracious virus in the vicinity. It is at just such a moment that the TB bug, already present in the lungs of most people, goes into action.

For many years I was an editor by day and a writer by night. It was my custom to dose myself with coffee and write until I fell asleep at the typewriter. A very silly way to live.

The insidious feature of tuberculosis is that one can have it in active form for a long time without displaying any symptoms, not only that, but the first symptoms to appear may not immediately suggest tuberculosis except to a specialist. Thus, unrecognized, it gains headway, so that by the time it is detected it may have progressed into an advanced or moderately advanced stage. I know now that I must have had it for years before realizing that I was actually ill. And after realizing I was ill it took almost a year more to discover what was the matter with me. In my ignorance I mistook the effects of physiological infection for the effects of psychological aberration.

In the late winter and spring of 1932 I encountered increasing difficulty in writing. Work which normally I ought to have

been able to do in a week took me three or four, and wasn't up to par. Editors told me my stuff was dull, that there was no life in it. I myself felt this, but rewriting only made the work duller and more lifeless than ever. At length I reached a point where I couldn't write at all.

I had a magazine article to do. It dealt with a subject that interested me and of which I had, in addition to a mass of collected material, considerable first-hand knowledge. It was an article that should have written itself, but it didn't. And I couldn't write it. I couldn't get properly started. But how I did try!

Every morning at eight-thirty (I am one who believes a writer should keep office hours) I would go to my worktable, read over the two or three pages I had ground out the day before—and tear them up. For a little while this difficulty in starting did not worry me. I have almost always had to grope and struggle for satisfactory beginnings, owing to a dubious habit of trying to frame felicitous paragraphs instead of going straight to the point. When day after day went by, however, and the time stretched into weeks, yet I could still get no farther, but felt my mind growing blanker and more blank, I began to realize that something must be wrong.

My mind, God knows, had been blank enough even in my most fluent days, but that had been a different kind of blankness, a normal, healthy blankness. It had not, for instance, been a prelude to overpowering drowsiness, except very late at night. But now, after an hour or two of straining to produce a paragraph, I became so sleepy that there was nothing for it but to lie down and sleep. This, mind you, at ten o'clock in the morning. I wanted to work. I needed to work. I had work to do, but I couldn't do it. A disconcerting situation.

A little knowledge, to coin a phrase, is a dangerous thing. Like many others in this enlightened age, I had picked up a smattering of psychopathology, and I now brought it to bear on my condition. "The trouble with you," I told myself, "is

that you're a quitter. This writing business has got you licked. You can't write, and you'll never be able to write. You're finished, and you know it. But you don't want to face the fact. Your ego can't stand reality. So you go to sleep. It's the old escape mechanism."

I did not like being called a quitter, even by myself. Although my daily failures had pretty well convinced me it was true, I did not want to admit that I was licked. So I kept on plugging away, some mornings turning out a few painful paragraphs, other mornings not a line, before falling asleep.

Thinking my incapacity might perhaps be the result of staleness and lack of exercise, I decided to try a few days of loafing in the mornings, with a little tennis in the afternoons. With work crying to be done, however, I could not make my mind relax, while as for the tennis, one of my major passions, I had scarcely energy enough to stagger through one set. I went back to my attempts to work, hoping desperately that some miraculous morning the fog would be lifted and the way made clear. It was a vain hope.

Yet in spite of the fact that obviously I was not myself, it still did not occur to me that I might be seriously ill. I was thin and had little appetite, but attributed these factors to worry, also I had a slight cough, but that I attributed to cigarettes. Another phenomenon more disturbing was this: sometimes, on rising from a chair, I experienced what I can describe only as a "rush of blood to the head", everything went black for a few moments, and I felt dizzy and had to hold on until my head cleared, to keep myself from falling. I didn't know quite what to attribute this to, but had a vague notion that a sluggish liver might be to blame. And then, as the good old silent movie titles used to put it, came a day.

Driving from my Connecticut home to New York, I suddenly felt myself losing consciousness. I had to exert all the will power I possessed to keep from going under. The attack was brief. A few seconds, and it had passed off, leaving a

queer, prickling sensation in my legs as it went. But though brief it was frightening. I had half a dozen such seizures in the course of a couple of hours, but weathered them by gritting my teeth and forcing myself to stay conscious and hold my car on the road. That drive scared me into going to a doctor.

I told him my symptoms. He placed his stethoscope over my solar plexus and my heart and listened briefly. "Been worrying?" he asked. I admitted it. "Smoking a lot?" he asked. I admitted that, too. "You've got," he pronounced, "a case of nervous shock."

He ordered me to forget about work, to lie around outdoors, to drink a quart of milk daily, and to cut down on smoking, which was doing my heart no good. When I objected that work was imperative, he modified his order. I was to loaf as much as possible, but in any event, after lunch every day I must lie down for at least half an hour with my chest exposed to the sun. This last bit of advice was the worst he gave me, for contrary to general belief, sunshine not only is not good in cases of pulmonary tuberculosis, it is often dangerous. But then, of course, though I showed four of the common symptoms—loss of weight, loss of appetite, abnormal fatigue, and a persistent cough, my doctor did not know I had tuberculosis.

However, home I went, quite cheered up, cherishing my newly identified ailment. It was a relief to know that there really was something the matter with me and that I hadn't been malingering after all. It was with a feeling somewhat akin to pride that I announced to my wife and my friends that I was suffering from nervous shock. Their sympathy was most enjoyable. I basked in it for several days. And drank milk. And broke cigarettes in half (but smoked the halves in swift succession). And exposed my chest to the sun. And coughed harder than ever. And felt more sleepy and tired. And wondered how long it would be before I should get well. (I am wondering still.)

I wondered also, the doctor having made no explanation, exactly what nervous

shock might mean, and, remembering the title of a book called "Outwitting Our Nerves," I borrowed a copy from the library. To my surprise and chagrin I discovered on reading this excellent book that my nerves, as such, were quite all right, that nervousness has nothing to do with the condition of the nerves themselves. The symptoms loosely labeled "nervous" thus or that spring from either a physical infection of some kind or a mental affliction. Having said nothing of any physical infection, the doctor who had examined me presumably had found none. By elimination, therefore, my ailment must be a product of my mind. Thus, in effect, I was led right back from my comforting state of real illness to my discomfiting previous state of neurasthenia. There was, however, a glimmer of light in the murk. My so-called nervous shock was nothing more nor less than a damaged psyche, but this (said the book) could be repaired by an effort of will, a determination not to give in.

I made the effort. Abandoning for a time the article which had become associated in my mind with the idea of failure, I tackled another and despite fatigue, drowsiness and muddle-headedness, managed to finish and sell it. But the cheerfulness this feat induced was short-lived. I couldn't write anything else no matter how hard I tried or how often I assured myself that I was ill only in my imagination. I was so befuddled at times that I'd find myself standing in a store unable to remember what I'd gone in to buy. By late afternoon my legs would feel as though I had on diver's boots. Never before had I known such overwhelming fatigue, or been so utterly discouraged, or seemed to myself so utterly worthless. And then, as though to prove my trouble spiritual and not physical, I suddenly entered upon a period of great activity.

A certain public-relations counsel invited me to work with him for a few weeks on a publicity campaign. There was a lot to be done and very little time to do it in. From having been in a sort of state of suspended animation, I came to life and worked at

high pressure. My daytime drowsiness disappeared. I commuted fifty miles morning and evening—except when I worked too late to go home—dashed about in subways and taxis, telephoned, dictated, banged the typewriter, smoked like a chimney, and enjoyed every minute. My morale shot up like a stratosphere balloon. My appetite came back. But I continued to cough with increasing violence and had night sweats, and so I went to a new doctor to try to find out why.

This second savant came closer to the truth than had the first. He found that my blood pressure was too low (another collateral symptom of TB) and that there was some "inflammation" in my right lung, and he said I was badly run down and ought to go away for a rest. When I explained that I had just started on a new job and simply could not go away, he shrugged somewhat wearily and prescribed pills for my cough, a tonic for my general condition, and as much rest as I could get.

On a later visit, when I told him I occasionally coughed up traces of blood, he again said I ought to go away for a rest. "There isn't a thing I can pin on you," he said, "but you're suspicious." I repeated that going away was out of the question. He then advised me to spend each week end in bed, from Saturday afternoon to Monday morning.

This seemed to do me so much good that I had the brilliant idea that a whole week in bed might cure me entirely. The difficulty was so to arrange my work that I could leave the office for that length of time. (I have been amused since at the importance I then attached to the span of a week. Up here, where we think in terms of years, a week is nothing.) However, the arrangement was made. I went to bed and relaxed and began to feel weak and ill. A few days later my wife, who had been making inquiries unknown to me, heard of the chest specialist who is head of the institution where I am now and drove me up to see him. As luck would have it, he happened to be one of the best men in the country. It took him only a

few minutes with a stethoscope and a tapping finger to reach a verdict: tuberculosis in both lungs. X-rays taken the same day confirmed his finding.

Now, some will say that mine was a special case—that I was more susceptible to imaginations and neurosis than ordinary, decent, non-writing folk. The fact is that my experience was a common one. More than fifty percent of my fellow patients were treated by their own doctors for almost everything except tuberculosis.

The average doctor—the general practitioner—is not very familiar with tuberculosis. He does not recognize it and seems loath to suspect its presence. He is not necessarily to be blamed for being unable definitely to diagnose the disease by ear; it is impossible to detect some cases by stethoscope and percussion alone. But, considering its prevalence, he is to be blamed for not oftener suspecting its presence when two or more common symptoms are manifest.

I shall never understand, even should he explain, why the scientist who considered me "suspicious" neglected to verify or disprove his suspicion by means of a tuberculin test, a sputum analysis, and an x-ray.

What does it mean to have tuberculosis? Well, sixty years ago it meant you were done for. Today, provided it is detected in time, it means a long bout of "curing"—how long, no one can tell in advance. Today it is no longer generally dreaded. This is, in a way, rather a pity. People know little or nothing about it, but they have a vague notion that it is under control. There is even in some quarters a disposition to belittle the seriousness of the disease. "Oh," said a friend of mine cheerily, "they've got TB pretty well licked nowadays." The reply to that is, "Oh, yeah?"

It is true that tuberculosis specialists have developed in recent years methods of treatment which, when scientifically applied, help to effect a large proportion of so-called "cures." It is true that thousands of cases which only fifteen years ago would have been considered hopeless

are today successfully arrested. It is true that the national tuberculosis death rate has been reduced from over 200 per 100,000 population to 60 per 100,000 (the rate is 47 in Connecticut). But it is also true that this disease is still the first cause of death in the 15-to-45 age class.

They won't have TB really licked until the rank and file of general practitioners learn enough about it and take sufficient interest in it to diagnose the incipient or minimal cases while those cases are still minimal.

And then they won't have it really licked until sanatorium or hospital beds are made available for all active cases. It is estimated that there are some 700,000 active cases in the United States. There are only 90,000 sanatorium beds. It is said that there are (at the time of writing) about 70,000 vacant beds in hospitals, but many hospitals refuse to take tuberculosis patients.

Thousands and thousands of men and women are forced by the lack of sanatorium facilities or the lack of money to pay for sanatorium treatment to take the cure at home as best they can under the care of their own physician, who may or may not know what it is all about. People can and do get well who cure at home, but comparative vital statistics prove the proportion of recoveries among them to be lower and the death rate higher than among sanatorium patients.

There is another important point to be considered in any discussion of tuberculosis, and that is that no two cases are alike and that treatment effective for one patient may be inapplicable or valueless to another. They may have TB pretty well licked in Tom's case, but not necessarily in Dick's or Harry's.

Among the things I have learned in this school is that the TB road is not a level highway over which one can gallop triumphantly to health. It is a tortuous lane that dips into valleys and twists around hills and doubles back on itself and seems at times to peter out like a wagon track in a pasture. A small proportion of patients, usually those fortunate enough to

have had early diagnosis, make steady progress toward recovery. But the majority have ups and downs. Their course is analogous to that of a story hero who escapes shipwreck to find himself on a cannibal island, escapes from the cannibals only to be caught by head-hunters, flees from the head-hunters into a river full of crocodiles, and so on, until at last he reaches the spot where the Marines have landed and have the situation in hand (where he is lucky if he isn't shot as a spy). My own course has been very much like that, as a result, while I am at present hopeful as to my eventual recovery, I am keeping my fingers crossed. I have found that it doesn't pay to take too much for granted.

It used to be thought that climate was a vital factor in the treatment of tuberculosis. The first step was to pack off the poor victim to the Adirondacks or the Rockies or the Great Smokies or even the Swiss Alps. In those resorts (if he didn't die of loneliness and homesickness first) he got better or worse as much in spite of as because of the rarified atmosphere.

The Connecticut climate in which I have been curing is anything but ideal. It is capricious and changeable, hot and muggy in summer, cold and clammy in winter. When the sanatorium in which I am a student was founded—the first in this state—people scoffed at the idea that TB could be cured in such a climate. Yet the proportion of cures here is as high as in more loudly touted resorts, if not, indeed, higher than in most of them. Of all the patients this institution has treated in the 31 years of its existence, 64 percent are living today—a remarkable record. True, in certain cases complicated by conditions such as asthma, a mild, dry, equable climate may be helpful, but for tuberculosis far more important than dry air or altitude is the intelligent and skillful handling of each case as its individual peculiarities may require.

An important factor is discipline. One reason why this sanatorium has such a splendid record is that its medical staff regulates strictly the activities allowed

each patient according to his or her condition, and the nursing staff sees to it that patients adhere to the prescribed limits. This rigid supervision is necessary, for without it most patients would be far too active for their own good.

The basis of modern treatment is REST. Few persons who haven't been in sanatoria know the meaning of the word as we are taught to use it. To us, rest means bed. It means lying flat in bed. All else is exercise. Sitting up in bed, sitting on a chair or recliner, reading, writing, playing solitaire, eating, talking—all these, in some degree, are exercise. This is among the things you have to learn, one of the hardest things. Lying in bed is irksome, especially when you feel quite well—as many do—and it is easy to invent pretexts for getting up.

I can speak with authority as to the irksomeness of lying in bed, having been what is known as a "strict bed" patient for twenty-two months. During the first six I was allowed, twice a week, to sit on a chair while my mattress was being turned and to stand on the scales every Saturday to be weighed. Then I took an accidental turn for the worse and for the next thirteen months was not allowed to get out of bed for any purpose whatever. After that came a couple of months of having a bathroom privilege, that is, walking to and from the bathroom once a day. Then a touch of grippe, followed by a hemorrhage and strict bed again.

Visitors in puckish mood sometimes say they envy us our being able to lie all day in bed, and offer to change places with us. I remember that in the old days I, too, used occasionally to wish I could go to bed for a month or two. Perhaps it would be fun if it were a voluntary indulgence. Certainly it would be a more profitable way to spend a vacation than the ways many people choose. But twenty-four hours a day in bed under compulsion is not fun, particularly when—as it is bound to be in tuberculosis—one's sentence is indeterminate. I've heard many a patient say he'd rather be in prison, for then he'd at least know when he would be allowed to get out.

While bed rest, the value of which was established by Dr. Edward Livingston Trudeau some fifty years ago, remains the foundation of TB treatment, it is supplemented today, when possible, by rest mechanically imposed on the lungs themselves. In effect this is analogous to encasing a bone fracture in a cast so that its knitting shall not be interrupted by movement.

Tuberculosis is seldom, if ever, totally cured. Its progress is arrested. This means simply that the tubercle bacilli are brought to a state of suspended activity. When active in a run-down body, they kill the tissue cells. Rest, proper nourishment, and pure air tend to build up bodily resistance to them. Gradually—this is what takes the time—they are walled up behind patches of scar tissue (fibrosis) which grows over the affected areas. Bed rest, minimizing the necessary movement of the lungs, promotes the growth of this scar tissue.

But though it reduces the lung movement, bed rest alone does not stop it. There is still enough motion to retard, or possibly prevent, healing. Hence the use of collapse therapy, to enforce absolute rest and immobility on the affected parts by putting the lung partially or completely out of action. As a rule if both lungs are diseased, only one, the worse of the two, is collapsed, placing the burden of breathing on the other.

The simplest and commonest method of collapsing a lung is known as artificial pneumothorax. Invented over forty years ago by an Italian named Forlanini, but subsequently neglected, this treatment has been in use in this country only about fifteen years. It was reserved at first as a last resort for patients apparently *in extremis*. Nowadays in up-to-date sanatoria it is tried on all but the very lightest and the completely hopeless cases. Pneumothorax consists in introducing sterile air, through a hypodermic needle, into the space (pleural cavity) between the wall of the chest and the outer covering of the lung.

Please note that this is not a process of "injecting air into the lungs," as one of

our journalist-medicos has stated in his column and as newspaper stories often have it. Injecting air into the lung would be as useful as injecting water into the ocean. The air goes on the outside of the lung. Carefully administered, a little at a time, the pressure of this air squeezes the lung down until it can not move. At least that is what happens if the patient is lucky.

I was not. I had too many adhesions. Which means that instead of merely being held against the chest wall by vacuum, my lung was stuck to it in several places, bound to it by tough bands of tissue. This is a common condition in tuberculosis. In some cases the diseased portion of the lung can be collapsed in spite of the adhesions. In many others the steady air pressure before mentioned breaks them down. Mine happened to be too thick and tough. In still other cases the adhesions can be cut, but the nature of mine made that operation (pneumolysis) out of the question for me.

The doctors were anxious to collapse my right lung because there was a hole in it. Such holes are called cavities, and the process of healing them over through fibrosis may be hastened if they can be squeezed shut and held shut by compression. My cavity was being held open by the downward pull of adhesions attaching my lung to my diaphragm. To relieve this downward pull, the doctors had recourse to phrenicectomy. Through an incision just over the collarbone, they removed a section of my phrenic nerve, the nerve which controls the right half of the diaphragm.

The effect of this operation is to paralyze the hemidiaphragm, which rises several inches, pushing up the bottom of the lung and preventing any further up-and-down movement. It was hoped that with the downward pull on the lung eliminated, the pressure of pneumothorax would close the cavity. But in this business nothing can be guaranteed. As it turned out, though the adverse pull of some adhesions was relaxed, there were enough others to hold the cavity open.

The doctors had another trick up their

sleeves. Having failed with pneumo, they tried oleothorax, oil injected into the thorax instead of air. This oil not only exerts a steady pressure on the lung, but also—if the patient is lucky—exerts a softening effect on adhesions, causing them to break or stretch and break.

It took a few months, but eventually the oil began to work and to close the cavity. In the interim I nearly died one evening by choking during a hemorrhage. Fortunately there was an oxygen tent at hand for such emergencies. If there hadn't been, I shouldn't have pulled through. As it was, I was pretty well "blued up," as one of the nurses put it, before I was able to breathe again. But that's too grisly an episode to expand upon here, except to add that when it was over, I found out what it is like to have a genuine case of nervous shock.

The oil did collapse my lung to a large extent, though not enough to close the cavity completely. Usually when one lung is collapsed, the other quite soon adjusts itself to doing all the work, so that the patient's short-windedness passes off. For some reason my "good" lung did not make this adjustment. For months I was so short-winded that I could not even turn in bed without getting out of breath. Because of this and the fact that the oil was evidently not going to do all that had been hoped, the doctors did not replenish the supply.

At length, as more and more of the oil was absorbed into my system and its pressure lessened, my breathing became easier. I was able to move in bed and to cough without gasping like a landed fish. I even managed to totter the few steps to the bathroom and back. But my wished-for and hard-won collapse disappeared. And whether or not my cavity will heal without further artificial aid only time will show.

Such aid will of necessity be surgical. By means of intercostal neurectomy—excising portions of the nerves controlling the motion of the ribs—my right lung, already motionless vertically as the result of the phrenic operation, can be rendered entirely immobile. If immobility should

prove ineffective, and if permanent, total collapse of the lung seems necessary, that can be accomplished by means of extrapleural thoracoplasty. This consists in cutting a length out of each rib on the affected side and closing the gap, so that the chest wall, reduced in capacity, automatically keeps the lung compressed.

I am hoping I shall not need thoracoplasty. Not only is it no pink tea, but there is a rather grim irrevocability about it. Suppose the "good" lung, which in my case isn't any too good, should prove unequal to the strain. That would be too bad. However, nothing ventured. Besides, I know several people who have undergone it and been saved by it and even enabled to live moderately normal lives. And what is the risk of dying compared with the chance of reentering the world and really living again?

There are no sensory nerves in the lungs. Consequently tuberculosis is painless. This is a pity. If it were painful, it would give early notice of its activity. Some of its complications, notably dry pleurisy, involve pain, but for the most part such suffering as tuberculosis causes is mental.

The initial shock of learning that they have the dread disease is more than some persons can bear, the prospect of the long course of treatment overwhelms others, still others can not endure the restraints of sanatorium discipline and routine, while others give in to homesickness. These people who are unable to adjust themselves to the circumstances are beaten before they start. A serene and philosophic attitude is of the utmost therapeutic value.

It is an attitude not easy to maintain, especially in the beginning. It is not easy to adjust oneself to an existence which, in contrast to a busy life, seems like a sort of living death. It is hard to reconcile oneself to doing nothing, to becoming a parasite. It is hard to go away from those one loves, not knowing how long the separation is to last, not knowing for certain that one will ever return to them. If only every phase of the cure were not shrouded in uncertainty!

Well, it is, and one must make the best of it.

And lest I seem to have written in a superior strain, as though I had found it easy to be philosophical and resigned, I hasten to admit that I am no stranger to either discontent or despair. I have known them both intimately. But since I am writing not from exhibitionist motives, but from a desire to spread information, I shall spare you the spiritual details of my own case.

This one feature at least is certain: that we who travel the TB road must consider ourselves forever after marked men and women. We must bear in mind—not to the point of developing a psychosis, but simply as a gyroscopic influence—that we carry within us the seeds of our destruction. For though when we are discharged as "cured" those seeds may be securely packaged in fibrosis, it requires but one or two indiscretions to tear the package and release them. We must resign ourselves to circumspection and moderation. Or else we are likely to find ourselves back in school for a post-graduate course, in worse condition than before. The known rate of relapse is twenty per cent. One-fifth of the patients annually admitted to sanatoria have had previous sanatorium treatment. Many of these repeaters have relapses through no fault of their own but because they were discharged prematurely. How many have relapses who did not cure in sanatoria in the first place or who do not return to sanatoria can only be guessed at.

From force of circumstances we lungers learn to appreciate the laws of compensation. I, for instance, shall never again taste the bittersweet joys of tennis. But by the same token I shall never again have to worry about my backhand. I shall never be able to plunge in and save a millionaire from drowning—not that I ever did, but I knew that I could, and the idea was an amusing one to play with. But after all, I tell myself, there is no record, outside of light fiction, that saving a millionaire would be a profitable enterprise. The chances are, in view of the tax situation

and the state of the market, that the poor wretch wouldn't even say, "Thank you"

I shall have learned in this school, by the time I am ready to be graduated, how long to work, how long to sleep, how much and what kind of exercise to take—in short, how to live For the cure is not over when you leave the sanatorium, even this sanatorium, which has a policy of keeping patients, in so far as possible, until they are fit to return to their old jobs I shall have learned what I may do with probable safety The trick will be to do no more

As I lie looking forward to the magic day when the boss doctor will examine me and tell me I may go home, I sometimes wonder Will this experience, granting that I survive it, be of any value to me? Will it have strengthened my character, broadened my outlook, increased my mental power, sweetened my nature? Or will it have been a mere unmeaning interlude, a cruise to nowhere?

In his biography of Cardinal Mercier, John A. Gade quotes the great priest thus

"Suffering accepted and vanquished will place you in a more advanced position in your career, will give you a serenity which may well prove the most exquisite fruit of your life"

I wonder I hope that will be true of me It isn't yet I doubt, I gravely doubt, that I shall be radically different from the person I was I should like to find myself in a more advanced position in my career, whatever that is to be in the future I should like to be serene And tolerant of my fellow man And grateful for small mercies But I wonder I'm not sure—I don't think it's in the wood

I imagine I shall emerge from my own bout with bacilli much the same as when I went into it Sadder, for the lost years Wiser, in certain ways But just as foolish in other ways—just as vain and frivolous and intolerant and extravagant, particularly the last I know I ought, when I go home, to be grateful for the open sky above and the ground beneath, grateful

for freedom and, indeed, for life itself But already I begin to hanker for the fleshpots I see myself mortgaging my future to buy the most expensive record-changing phonograph on the market (with records to match) and an expensive, beautifully built car I shall want a big, numerous car, and I shan't be happy till I get one

Idiotic? Of course But that's the person I've always been Probably it is as well that I have not changed For if ever I am so radically changed that I no longer yearn for things I have no right to want, I shall know that I am done for at last

EWENS, A. E., An Overlooked Factor in Susceptibility to the Common Cold West Virginia M J, 29 1

This article is a plea that greater attention should be paid to the uvula as a factor in the causation of coughs and "colds" In the absence of a known bacterial cause, or causes, for these common and troublesome affections and the improbability that serological treatment would be of avail even if the bacterial cause were known, is it not beside the mark to transfer attention to structural abnormalities of the nose and throat, which, conceivably, may tend to lessen resistance to catarrhal infections Acting on this idea, the author has found that the routine employment of staphylectomy, or removal of the uvula, for the treatment of habitual clearing of the throat and paroxysmal cough has been beneficial, and, a rather amazing fact, has also exercised a remedial influence upon catarrhal conditions of the entire upper respiratory tract After following up his cases, the author has come to the conclusion that staphylectomy checks susceptibility to "colds" in more than fifty per cent The beneficial results from this operation are seen, objectively, in the reduction of chronic post-nasal engorgement to a degree that definitely facilitates nasal breathing, and the characteristic signs and symptoms of pharyngeal and naso-pharyngeal catarrh are rendered permanently less pronounced

EMPHYSEMA IN INFANTS AND CHILDREN

(Continued from page 13)

sorted to This is indeed a radical position to assume and at the present time this type of treatment is not resorted to unless other procedures fail The criteriae in any case of empyema should be early and adequate drainage, with especial stress on adequacy It is felt that closed drainage as well as repeated aspiration, in many cases, will effect a complete cure

For the past few months on the service at both white and colored units of Grady Hospital, Atlanta, Georgia, multiple aspiration treatment has been tried and has proven to be successful in many cases Several cases have also been treated with air replacement and this too has proven to be of value in certain instances This method of approach has been carried out with complete surgical supervision and co-operation and such surgical intervention that has been necessary has been done

The following procedure in many of our cases has been the rule With daily examinations it is felt that a great majority of the cases have been diagnosed early, and when diagnosed enough time is taken to allow the fluid to coalesce and gravitate to the dependent portion of the pleural cavity A pleural tap is then done and all of the fluid removed The fluid is replaced by almost an equal quantity of air, by the

multiple syringe method Following this procedure an x-ray is taken and if no adhesions are present this method is continued at intervals or as rapidly as the empyema cavity fills With air replacement and in the absence of adhesions the lung on the affected side is partially collapsed and this aids materially in that pus formation seems to be curtailed

Adhesions of the pleura are a contraindication to air replacement and when this condition is present multiple aspiration alone is done at intervals If the abscess cavity can be evacuated completely and if the pus is not too thick to drain through the aspirating needle, this procedure is carried out, in many of our cases, until complete recovery At times, however, the empyema cannot be adequately drained with aspiration and in these cases surgery is immediately resorted to

It is hardly necessary to state that every case of empyema is a distinct problem unto itself and that no hard and fast rules can be applicable to each case In some instances it is felt that due to the general condition of an infant or child immediate closed or open drainage should be done, and in a few of our series this has been done with equally as successful results

PRESENT DAY CONCEPTIONS OF RENAL TUBERCULOSIS

(Continued from page 10)

are detected and the patients placed in a sanatorium where they may have the advantage of general hygienic measures and

heliotherapy may we not look forward to the possibility, in many instances, to the arresting by healing of early renal lesions,

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the same as takes place in extra urinary foci? Also, by recognizing the fact that persistent pyuria and dysuria often denote renal tuberculosis, and that if in all such cases thorough study be made, fewer cases would pass the stage when the disease is surgically curable. Furthermore, with the building up of resistance (a body force which has often been clearly demonstrated in the study of tuberculosis) the

end results, when surgery is employed, would be more satisfactory. Lastly, the treatment of each case based upon the individual analysis will give the best assurance of permanent alleviation of symptoms, having in mind that tuberculosis is a general disease, and that positive rules for its management are no more applicable to cases of renal tuberculosis than to tuberculosis located elsewhere in the body.

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ABSTRACTS



This department is devoted to abstracts of articles carefully and judiciously selected by the Editorial Staff

ROLES, F C, and TODD, G S Bronchiectasis
Brit M J, 2 639

The authors have studied, at the Brompton Chest Hospital, 106 cases of bronchiectasis of all types, with a view to establishing the prognosis under the various types of treatment in vogue. The period of observation was never less than three and up to six years. Their cases are classified as "dry" when there is no expectoration, "septic" when there is purulent sputum, and "fetid" when the sputum is copious and foul. "Simple" cases, with occasional sputum, seem to have as bad a prognosis as those which are consistently "septic." They find that bronchiectasis which receives only medical treatment is an extremely fatal disease, since, during the period of observation, of 49 cases treated thus, 23 are dead and nine totally incapacitated. Of the remainder, only four were "dry" five years from diagnosis.

It is suggested that in order to secure early diagnosis of cases of bronchiectasis all doubtful cases of hemorrhage and cough in which tuberculosis has been excluded by ordinary x-ray examination should again be x-rayed after lipiodol injection. It is emphasized that a lateral x-ray examination is necessary in some cases where screening shows an apparently unilobar distribution of the lipiodol.

As regards operative procedures, phrenic evulsion is found to be of doubtful value, it is not indicated where lobectomy is at all possible. It may be used when artificial pneumothorax is contemplated. Thoracoplasty is a useful operation in advanced unilateral disease and will render existence more tolerable for the patient and for his friends. It should never be contemplated when only one lobe is in-

volved. Artificial pneumothorax now finds its chief use as a preliminary to lobectomy, a procedure which has proved to be a tremendous advance in the treatment of bronchiectasis. Lobectomy in the right hands has been shown to have an extremely low mortality (only two operative deaths in the last 34 cases during the past two years at the Brompton). It is of course the only radical method of cure of a localized bronchiectasis. Its use demands diagnosis with certainty at an early age and experienced attention to pre- and post-operative measures.

WALL, C., and HOYLE, J C Observations on Dry Bronchiectasis Brit M J, 1 597

Since the advent of lipiodol radiography the condition of "dry bronchiectasis" has been recognized. While the authors have only been able to collect 30 published cases, they now add to these 20 personally observed cases. Since these were seen within a period of only two years, they suggest that this condition is probably quite common. Many of the previous cases were recognized on account of haemoptysis, this has not been a common symptom in this series, being present in only five cases. Dry cough is the commonest symptom. Bronchopneumonia (usually following measles, whooping-cough, or influenza), during childhood or adolescence, is the commonest antecedent condition. The bronchiectasis is usually basal, abnormal physical signs, such as dullness, diminished breath sounds and crepitations, may or may not be present. The only certain means of diagnosis is by lipiodol radiography. To explain the etiology, the authors suggest that if for any reason (as from obstruction of bronchioles by exudate) the air does not enter the alveoli during inspiration, the force of the inspiratory effort is transmitted to the bronchi to which

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the air has access. If the mediastinum is fixed by adhesions so that it cannot move towards the side of the threatened vacuum the probability of bronchial dilatation is greater.

The two great risks in these cases are sepsis, with the development of "wet bronchiectasis," and serious hemorrhage. None of the cases in this series has become septic during observation and only two of those reported in the literature. Haemoptysis is a much greater risk, although this complication, too, is not really common. It is usually recurrent, if it occurs at all, and may seriously endanger life. Lobectomy may be considered in unilateral cases. It was not practiced in any of the cases in this series. In favor of conservative treatment is a certain amount of evidence to show that the bronchi may sometimes spontaneously revert toward their normal condition.

MOSCHOWITZ, ELI Hypertension of the Pulmonary Circulation. Its Causes, Dynamics and relation to Other Circulatory States. *Amer Jour of Med Sc*, p 388

Hypertension of the lesser circulation is common. It passes generally under the name of "pulmonary congestion," "right-sided insufficiency," or "arteriosclerosis of the pulmonary vessels." It is caused by any lesion that increases the peripheral resistance within the lesser circulation. The most common causes are mitral disease, especially mitral stenosis, emphysema, whether primary (senile) or secondary (asthmatic), infiltrating lesions of the lung (chronic tuberculosis with induration, bilateral pleural synechiae, chronic interstitial pneumonia, tumors), kyphoscoliosis, patent ductus arteriosus and communications between the two sides of the heart. A sustained hypertension of the lesser circulation leads to arteriosclerosis of the pulmonary vessels. A "primary" sclerosis of the pulmonary vessels, if it exists at all, is extremely rare. There is an inter-dependence in the incidence of arteriosclerosis of the greater and lesser circulations. The compensatory dynamics following hypertension in the lesser circulation are described. The physical signs of

hypertension in the lesser circulation are those brought about by the compensatory mechanism. In the main these are: Increased venous pressure, accentuation of the second pulmonic sound, dilatation and hypertrophy of the right heart, dilatation of the superficial veins (especially pectoral), enlargement and tenderness of liver, lowered kidney function and infarction of the lungs. It is the hypertension and not the arteriosclerosis that is responsible for this clinical syndrome. As in the greater circulation, it is the disturbed function and not the anatomic sequence that is at fault. A transient (usually) terminal hypertension of the lesser circulation arises under a number of other conditions. In general vascular hypertension, hypertension of the lesser circulation may follow mitralization, when myocardial insufficiency sets in and when there is an associated emphysema. This explains, in part, the difference between the pale and the cyanotic hypertensive. In left coronary artery disease hypertension of the lesser circulation arises only after myocardial insufficiency sets in. The so-called "Ayerza's disease" is not a disease, but a syndrome developing from any lesion that causes hypertension and consequent arteriosclerosis of the lesser circulation. The constant relation of syphilis to this disease is not proven. Edema of the lungs may either follow or cause hypertension of the lesser circulation. Changes in cardiac rhythm cause hypertension of the lesser circulation only when myocardial insufficiency arises. There is a likelihood that cirrhosis of the liver associated with cardiac disease is the result of the increased venous tension within the hepatic area and of an hepatic arteriocapillary fibrosis. Hypertension of the lesser circulation may be the mechanism of the hitherto unsatisfactorily explained cyanosis in congenital heart disease.

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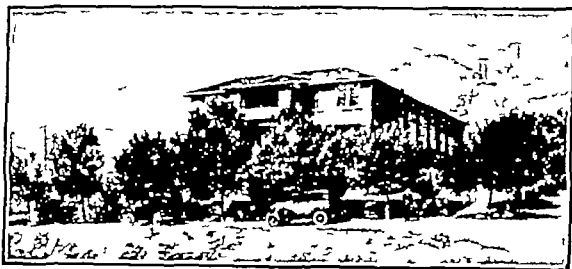
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CASE REPORTS*



*This page is devoted to Queries and Answers as well as Case Reports

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SPONTANEOUS PNEUMOTHORAX

James B, age 17, high school boy Presented himself to me Nov 2, 1935 Family history Father suffered from asthma, mother in good health Brothers and sisters in good health Patient also was subject to asthmatic attacks

The mother of this boy stated that, at birth, he was a forcep delivery case and that at that time his chest was badly crushed, as a result of the instrumental delivery He had never been very strong

History of present illness After playing rather strenuously at school, he fainted and was brought home suffering from some shortness of breath, which had increased Patient was a tall, overgrown boy, height six feet five, weight 116 The patient stated that he was short of breath, was nervous and could not sleep, had poor appetite and was easily fatigued His mother feared that he might have tuberculosis He had no temperature, his pulse was 100, blood pressure 110-85

Physical examination Inspection Showed a pigeon breasted chest, the ribs coming to almost an acute angle with the sternum, and the anterior posterior diameter of the chest appeared to be greater than the lateral line The heart beat could be visualized only on the right side, outside the nipple line Left side of the chest appeared to be bulging, the intercostal spaces being barely visible Palpation, negative Percussion, showed hyperresonant note over the left lung, with cardiac area of dullness over the right Auscultation right lung Was negative for rales and the heart beat could be heard in the region of the nipple Auscultation left lung Showed very faint respiratory sounds Tinkling and metallic sounds could be heard following cough and formation Heart sounds were normal

Fluoroscopic examination Showed a complete pneumothorax, left side, with heart displaced to the right, with a small amount of fluid in the extreme costophrenic angle

Diagnosis Spontaneous pneumothorax of five days duration following violent exercise 750 cc's of air was withdrawn by reversing the Floyd Robinson Pneumothorax Machine Three days later 500 cc's of air was withdrawn One week later the lower lobe was re-expanding (by fluoroscopic examination) and the heart was returning to its normal position The patient was comfortable and was allowed to return to his school work, but cautioned against any physical exertion He returned again two weeks later and since the lung was re-expanding he was told to report for fluoroscopic examination in a couple of weeks and if by chance there was any increase of shortness of breath or any other untoward symptoms he was to return earlier

Conclusion It is quite probable that the patient as the result of violent exertion ruptured a small emphysematous bleb, which, no doubt existed as the result of his former asthma J W L

Loss of Weight LOSS OF WEIGHT has long been regarded as one of the cardinal manifestations of pulmonary tuberculosis, but its diagnostic significance in incipient cases appears to have been exaggerated to a great extent In very early cases the impairment of nutrition is but trifling or absent altogether Slightly later in the disease, it is an almost invariable accompaniment of other symptomatic disturbances, and is then highly suggestive of tuberculosis As a general rule, patients exhibiting decided emaciation have been afflicted for a long time, and manifest other evidences of the tuberculous nature of the affection

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